Electrical World

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Atlantic City

JUNE 7, 1947

Annual E.E.I. Convention Report Issue

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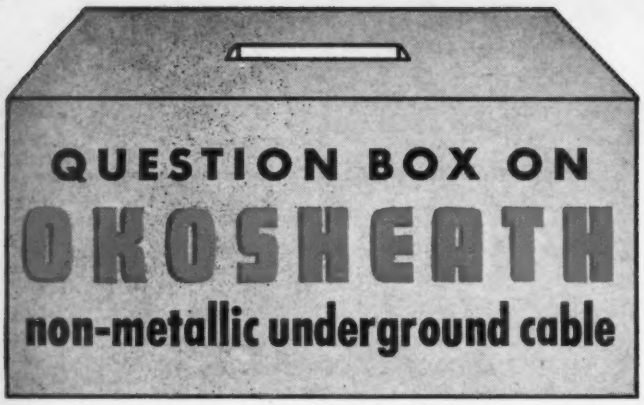


Q. What are the principal advantages of non-metallic underground cable?

A. They are less costly, light in weight, not damaged by chemical corrosion or electrolysis.

Q. Which is the simplest type of non-metallic cable?

A. Okosheath—which has but a simple mold-cured covering of high-tensile-strength, moisture-resistant rubber compound that provides both electrical and mechanical protection.

Q. Is this desirable?

A. Yes, indeed, because there are no fibrous coverings to rot, no saturants to clog ducts, and you'll find Okosheath a cinch to splice.

Q. Can Okosheath be buried direct in a trench?

A. Certainly—millions of feet have been giving failure-free service for nearly 20 years under these conditions.

Q. What about service range?

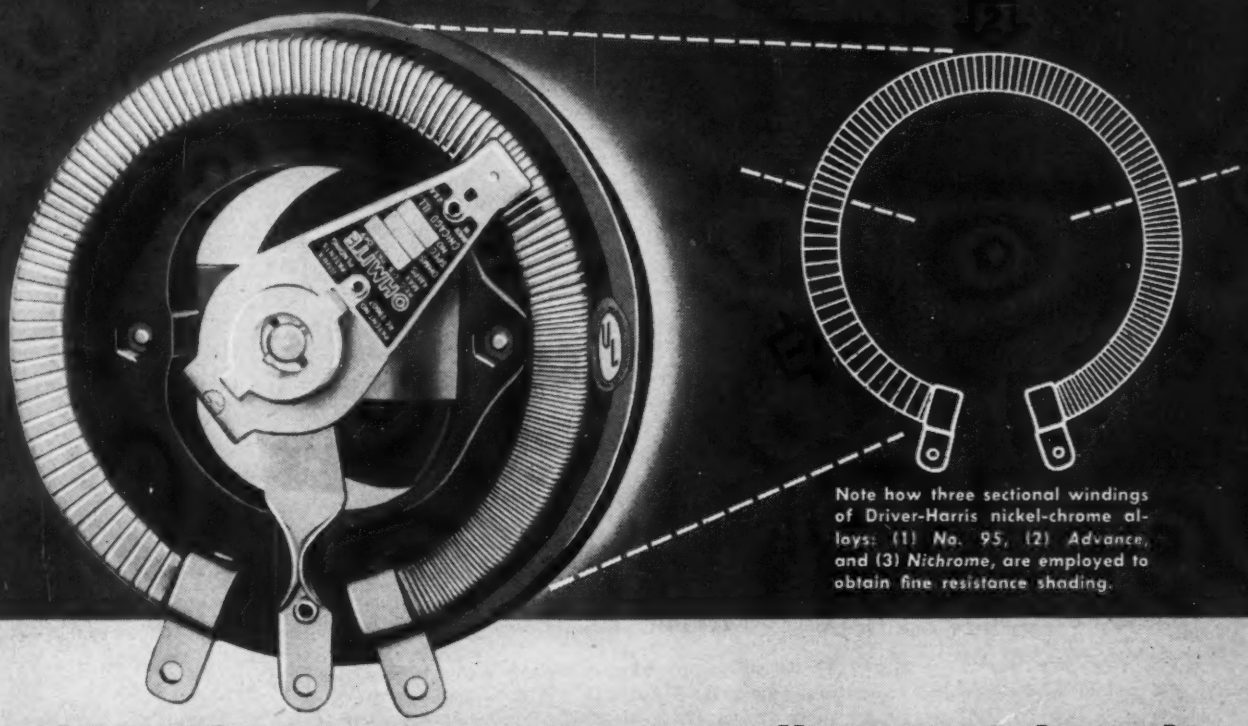
A. Okosheath is made in all sizes—can be used up to 2000 volts for a.c. networks, power distribution, underground entrances, signaling and control—in ducts or buried direct. It can be also supplied with an oil-resisting bonded Okoprene outer jacket made with neoprene.

Q. Where can I find out more about Okosheath?

A. Ask your Okonite representative or write direct to The Okonite Company, Passaic, New Jersey.

Resistance Control Problems

"Taper Off"



Note how three sectional windings of Driver-Harris nickel-chrome alloys: (1) *No. 95*, (2) *Advance*, and (3) *Nichrome*, are employed to obtain fine resistance shading.

When Rheostats are Sectionally Wound with

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In the 3-section, 500 watt Ohmite Model R Rheostat illustrated, three Driver-Harris nickel-chrome alloy wires—*Nichrome**—*Advance**—and *No. 95* are employed to obtain the fine shading of resistance desired. For other resistance combinations, there are more than 80 Driver-Harris *electrical resistance alloys* specifically designed to fill the numerous requirements of the Electrical and Electronic Industries.

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YOUR CHANCES OF GETTING AHEAD

FOR 20 years we have been whittling away the foundations of our economic structure. We have been cutting away the incentives to "get ahead in the world," to increase production and to improve efficiency. Unless this process is reversed soon, we risk the sort of industrial stagnation that currently afflicts Great Britain so disastrously.

How far the whittling has gone is shown by the statement in the center of the page. It shows that everyone's stake in working harder and getting ahead has been reduced sharply since 1929. In that year, anyone who was even moderately successful could look forward to reaping the rewards of his success. If he earned $5,300 annually over a period of 25 years he could retire on a comfortable income of $3,000 per year. Or he could pile up enough capital to go into business for himself. He could fulfill the American dream as phrased by Abraham Lincoln in his first annual message to Congress in 1861:

"The prudent, penniless beginner in the world, labors for wages awhile, saves a surplus with which to buy tools or land for himself, then labors on his own account another while, and at length hires another new beginner to help him. This is the just and generous and prosperous system, which opens the way to all, gives hope to all, and consequent energy and progress, and improvement of condition to all."

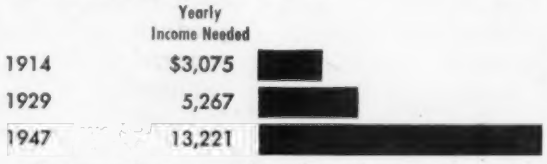
Look at the situation today. To retire on an annual income from investment that will buy as much as $3,000 did in 1929, a young man needs to earn over $13,000 a year for 25 years. That's more than 2½ times the income he would have needed in 1929. The same thing is true of acquiring a stake in a business.

YOUR CHANCES OF GETTING AHEAD

To see how your chances of getting on in the world have changed during the past few decades, the McGraw-Hill Department of Economics has calculated how much it now takes to save enough to acquire a retirement income or a comparable stake in a business, as compared to what it took in 1914 and 1929.

The objective set is an income from investment equal to $3,000 a year in 1929 dollars. It is assumed that the savings required to yield this income are made over a period of twenty-five years. During that period it is also assumed that $4,000 per year (in 1929 dollars) is spent on living expenses.*

Here is how the figures work out:



It now takes more than four times as large an annual income as it did in 1914 to gain a comparable stake. It takes well over twice as much as it did in 1929.

Changes in three factors — federal income taxes, living costs, and interest rates — explain why the income needed has multiplied so. Here's how these factors line up for the three years.

	Federal Income Taxes Married Man, 2 dependents		Cost of Living (Index Numbers 1935-39)	Interest Rate High-grade Corporate Bonds
	$5,000 income	$10,000 income		
1914	$10	$60	71.8	5%
1929	$3	$40	122.5	5%
1947	$589	$1,862	155.0	2½%

Similar calculations show that if we could reduce federal expenditures from $35 billion to $25 billion annually, raise interest rates by one-tenth and lower living costs by 15% — all realistic possibilities if we make the effort — then the income needed to build up such a retirement fund would come down to $9,500. The chances of realizing that goal would then be restored to what they were in 1929.

*Several other factors were omitted from the calculations because they would not have a decisive effect on the results. Thus, existence of social security pensions and retirement funds now reduces the income needed; but if state income taxes were added, the income needed would increase.

Why Try to Succeed?

While the income needed for retirement today has increased 2½ times — or by more than 150% — since 1929, the average person's income has increased only 80%. So the average man's chances of achieving success are really slimmer now than a generation ago.

This 1929-47 trend is something new in America. The average person's chances of getting ahead improved during 1914-29. In that period the dollar income needed for retirement or a stake in business rose by 75%, but the average income rose by 100%. So more people were within striking distance of success and security in 1929 than in 1914. The story has been different since 1929.

Fewer people actually do achieve financial success today. Only 1% of all families now have incomes large enough to build up a retirement fund or a stake in business. In 1929 almost 6% of all families attained a comparable degree of success.

Higher taxes are the most important reason why it takes so much more now to build up a competence. They account for one-half the increase in the amount needed. The other half is explained by higher living costs and lower interest rates.

It is, of course, true that few people ever get into the higher income brackets. So the process of cutting

away the incentives which play such a key role in our economic system affects comparatively few people immediately. It does, however, have a powerful indirect effect on all of us.

Everybody Loses

When half to four-fifths of any additional income of successful people goes to Uncle Sam a heavy drag is obviously put on doing the work to get it. Thus, we stand to lose the benefit of full use of the nation's best brains. By so doing we stifle industrial progress. And the loss in productive efficiency far outweighs the tax revenue the Treasury gains. Carried far enough, the process of stifling economic progress by slashing rewards leads straight to industrial stagnation.

The same process also multiplies the risks of embarking on new capital investment. High taxes rule out all but the most profitable new projects and restrict most expansions to boom times when profits are high. So capital investment follows a boom and bust pattern and, by so doing, contributes much to ups and downs in production and employment.

The Sorry Plight of Britain

The case of Britain today provides an object lesson of how blighted incentives produce industrial stagnation. *Britain's number one economic problem is to get more production. But the tax load there is so heavy it stifles the incentive to produce more.*

A coal miner who works an extra shift pays about a third of his added earnings to the tax collector. And, as the London *Economist* comments, tax rates on business executives are so high that they kill every incentive except that to tax evasion. In short, not only is the incentive to succeed blighted, but so is the incentive to work.

A root-cause of Britain's trouble is this: The cost of an expensive program of social benefits has been piled on top of the heavy costs of paying for past wars and trying to prevent future wars. Tax rates are boosted accordingly. What her experience proves is that the attempt to provide excessive social benefits may defeat itself. It raises the tax burden on rich and poor alike and smothers the incentive to work. So the underlying basis of all economic benefits—production—is eaten away.

We in the U. S. haven't traveled as far down the stagnation road as Britain has. Taxes amount to about 26% of national income here as against about 45% there. But, unless we start soon to build up incentives to do better work, instead of whittling them away as we have been doing, we will catch up with Britain fast.

It's Late but Not Too Late

Can anything be done? Decidedly yes, *particularly by tax reform and reduction in the cost of living.* As far as interest rates are concerned, any large increase would raise excessively the cost of carrying our war-swollen national debt, and hence raise taxes. But some increase in what are now excessively low interest rates may well be both feasible and desirable.

Action on the tax front is the first order of business. Our jerry-built tax structure is the thing that is chiefly responsible for cutting the incentives to work harder. Two things are important: 1) Government spending must be pared to the bone; 2) The tax system must be completely overhauled to remove the shackles on all-out production.

The 56th editorial in this series, published in March, outlined major steps that need to be taken in remodeling federal taxes in order to increase incentives to individual and business enterprise. *The revenue bill now before Congress is no more than a short step in the right direction. Much more must be done to clear the way for high production and rising living standards.*

Lifting the blight which taxes now place on incentives would help cut the high cost of living. It would stimulate greater production and greater efficiency. But a further step is necessary. Part of the benefits of improved efficiency must be passed on to consumers in the form of lower prices.

In the past few years we have been following precisely the opposite course. In many cases wages have been increased all out of proportion to increased productivity. Result—soaring prices and a severe squeeze of the consumer, to which some greedy exploitation of war-created shortages has also contributed.

To Give Ability a Chance

Our basic and most crucial problem is to get back on the track which leads to higher production and improved living standards all along the line. We got off that track in the 30's. Then, we started scrambling for larger slices of the same pie instead of trying to produce a larger pie. Now the process of getting back on the track is greatly complicated by the tremendous tax burden growing out of the war.

Yet it's not too late to turn back from the road that leads to industrial stagnation. As the statement in the center of the page shows, we could restore the odds of getting ahead to what they were in 1929. Cutting the federal budget to $25 billion a year and putting the tax structure in good order are the crucial first steps.

By taking these steps soon, Congress can go far to restore the incentives to hard work and efficiency which have been so largely washed away in the past 20 years. If they are not taken the American dream of getting ahead by hard and effective work will exist only in the history books, and our children will inherit from us an economic order without opportunity, without hope, without individual liberty.

President McGraw-Hill Publishing Company, Inc.

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National Electric Products Corporation
Pittsburgh 30, Pa.

Electrical World

JUNE 7, 1947

Squarely in Management's Lap

It took a big industry to power the machine which won World War II. Yet, during the past year, it has become obvious that huge extensions, 20 to 30 percent of existing power capacity, will be necessary as fast as equipment can be installed, to power the peace.

In a keynote address of Edison Electric Institute's 15th Annual Convention comes a staggering glimpse of the future. Whether the industry reaches Elmer Lindseth's "straw man" of 250 million kilowatts by 1976, halves it or doubles it, power supply will be mighty big business in the 30 years during which a complete new generation of men must take over.

Lindseth's point is simple. Even if the industry had all the young engineers, operators, commercial talent and financial astuteness it needs now—which it most assuredly hasn't—even then, it would be sadly unbalanced in face of its vaster responsibilities of the next 30 years.

Lindseth emphasized the industry's manpower deficit, the fact that utilities offer less attractive terms than competitors. Yet its future, actually, is hard for any competitor to match. To make his point, Lindseth noted that half of the operating companies must replace all five top executives within 15 years, while better than nine of ten among the remainder must replace a majority.

With opportunity ahead such as this utility president foresees, what is management's problem? Better employee relations up and down the line? More money and greater opportunity for advancement for younger men—spelled out where they can see the facts?

Why should not more utility personnel managers take a leaf from the promotion and advertising of such leaders as General Electric and Westinghouse? Both have aggressive literature and high-grade engineering personnel whose business it is to sell a career in engineering to young men. If there is to be a joint "sales" effort by utilities, as suggested by Lindseth, the investment might begin with a study of what the engineering graduate really wants—career, community standing, money, a real job to do during his precious lifetime?—and what inducements the industry must offer to persuade him to follow this, rather than some other, course. This is strictly a management problem. Manufacturers have found several working solutions, and are using them aggressively.

The fact remains that the utility industry, with a few notable exceptions such as Lindseth's own 20-year rise to the top, has not generated too happy a record among thousands of engineers who entered it with glowing hopes late in the '20's. Many now classed as "assistant engineer" and "supervisor" are hardly boosters for the opportunities within their industry.

The time is ripe now for long-range planning of skilled technical personnel if the industry in 1976, as visualized by Lindseth, is not to be staffed by second raters and the infirm.

★ ★ NEWS OF THE

Men, Money, Farms and Labor Dominate E.E.I. Convention

Young Men Needed by Industry—Oakes Elected President—The Coffin Award Revived—Blizzard Linemen Commended—Creative Selling by Better Salesmen Essential in Future

BETTER PAY to attract young ambitious men into the industry and to hold men of demonstrated competence was the principal theme of the Edison Electric Institute Convention at Atlantic City, June 2 to 4. This idea was stated in the headline paper of the meeting, that of Elmer Lindseth, president of Cleveland Electric Illuminating Co., and also in the engineering and sales committee meetings the day before the convention opened. Abstracts of Mr. Lindseth's and other convention papers appear in following pages.

Charles E. Oakes was elected to succeed Grover C. Neff as president of the Institute and Ernest R. Acker was named vice-president. Mr. Oakes is president of the Pennsylvania Power & Light Co., moving to that position in 1945 from the presidency of the Birmingham (Ala.) Electric Co. Mr. Acker is president of the Central Hudson Gas & Electric Corp.

The New York State Electric & Gas Corp. received the Charles A. Coffin award, most highly coveted distinction for which electric utility companies can compete. Ralph D. Jennison, president, accepted the award for his company. The award was made for economical utilization of low-cost fuel in the production of exceptionally low-cost energy, for the company's record in extending service to farmers, for marked improvement in financial structure, and for excellent performance in sales, service, rates and employee, customer and public relations.

The Reddy Kilowatt Annual Report contest was won by the Union Electric Co. of Missouri for its dramatic presentation of the downward movement of electricity rates in contrast to the general rise of living costs. Also for its demonstration of the fallacy of "cheap public power" by showing that the company could have given free service to its residential customers for nine months if the company had paid no taxes.

For their feat in repairing a damaged transmission line in a snowy windswept Rocky Mountain pass, twelve employees of the Public Service Co. of Colorado were given the Claude L. Matthews valor award. These linemen worked eight days continuously in blizzard weather to keep the line in operation, thus preventing failure of service to a large area of the state.

Ways to recreate interest in 60-cycle engineering among college faculties and their graduates evoked an energetic discussion at the session of the Engineering Division General Committee. A motion was unanimously approved that the division consider a program to restore power system courses in technical schools. A. L. Penniman, Jr., Baltimore, said it was urgent to "put some glamor back into power engineering." H. L. Melvin, Ebasco Services, reported that a scouting trip for recruits had not been too successful partly because many graduating students were most strongly attracted by the lure of newer branches of the electrical arts.

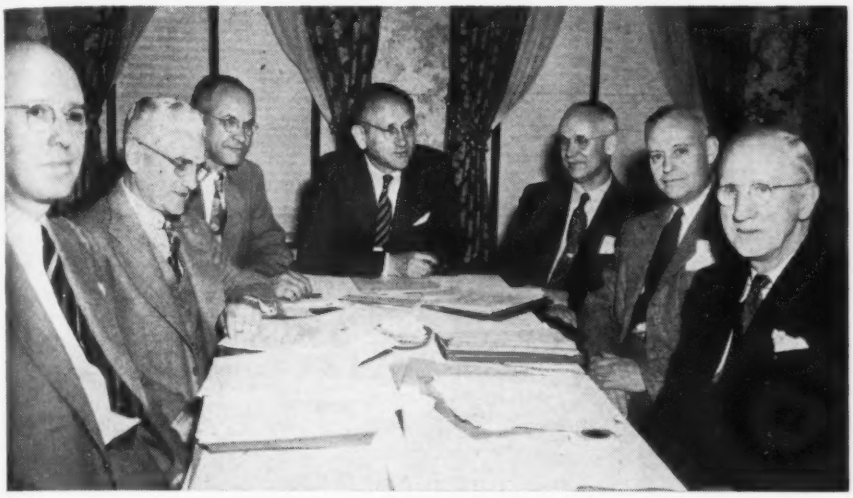
Reciting the activities of the prime movers committee, G. C. Daniels, Commonwealth & Southern, said that continuous study of production outages seemed to show that turbines of recent vintage are no more reliable in performance than earlier types. P. M. Lefever, Susquehanna Electric Co., expressed the fear that operators of privately owned hydro systems are much too prone to let federal engineers take the spotlight in this field and should come up front in contributions to current technical literature and discussions.

As the gap narrows between the cost of supplying electric service and the price at which it is sold, more and more power companies will be forced to sell harder and harder in order to maintain earnings, said Ralph Wagner, Chairman of the Commercial General Committee.

The theme of approaching necessity for intensive creative selling received additional emphasis from each of the succeeding speakers. Unintentionally anticipating the tenor of Mr. Lindseth's paper the next day, R. S. Bell, Commonwealth & Southern, said that better sales can be realized only by better salesmen and better salesmen will have to be paid more money, a lot more

CHARLES A. COFFIN MEDAL
FOR DISTINGUISHED CONTRIBUTION TO THE DEVELOPMENT OF ELECTRIC LIGHT AND POWER FOR THE CONVENIENCE OF THE PUBLIC AND THE BENEFIT OF THE INDUSTRY AWARDED TO
NEW YORK STATE ELECTRIC & GAS CORP.
1946

COVETED AWARD—On the basis of 1946 accomplishments, the New York State Electric & Gas Corp. was awarded the Charles A. Coffin Award at the E.E.I. meeting in Atlantic City. Reinstated after a war-time suspension, the award is made to an electric company which during the preceding year has achieved the greatest advancement in its operations and physical plant



POWER COORDINATORS—Chairman Philip Sporn and members of the General Committee for the Coordination of Power Supply in the North Central area as they met at the E.E.I. annual meeting in Atlantic City. Left to right are: H. S. Fitch, West Penn Power Co.; E. S. Fields, Cincinnati Gas & Electric Co.; V. M. Marquis, American Gas & Electric Service Co.; Mr. Sporn, American Gas & Electric Co.; H. P. St. Clair, American Gas & Electric Service Co.; Elmer L. Lindseth, Cleveland Electric Illuminating Co. and A. N. Cartwright, West Penn Power Co.

money than the power companies have been used to paying.

Included in the farm electrification job facing the utilities, according to Roy Godley, E.E.I. staff, are two major considerations. One is the utilization of electric service in farm operations, a job as yet hardly started. But absorption in this task should not obscure another matter that may very well be the more important of the two considerations. This is the duty of the utilities to cooperate extensively in the whole picture of agricultural development, soil conservation, stock improvement, crop betterment, market enlargement, as well as participation in farm youth movements and all other efforts to raise the economic and social level of farm living.

In too many places commercial electric cooking is like a hefty fullback kept warming the bench by a coach who for personal reasons does not want him in the game, said Grant Parry, New Jersey Power & Light Co. It is difficult to get the wholehearted backing of the industry in the promotion of this class of business, he asserted. Yet commercial cooking can earn 9 percent on the investment to serve it and it can be sold at from 30 to 40 cents per dollar of revenue. It is a most desirable kind of load with high diversity factor and the market is now only about 5 percent saturated.

There was a time not so far back in history as not to be remembered when residential sales saved the neck of the electric utility industry, and that time may come again, said J. M. Stedman, Pennsylvania Power & Light Co. Like many others, buyers of electric appliances are on strike right now or close to it, but the market they represent still remains. This market will have to be sold and the power companies had better be ready for that selling job.

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Operating Revenues Rise 11.2% in First Quarter

Electric operating revenues of the larger privately owned electric utilities in the United States for the first quarter in 1947 were $912,135,000 compared to first quarter 1946 revenues of $819,912,000, an increase of 11.2 percent. Revenue deductions (including operating expenses, depreciation and taxes) were $704,205,000, up 15.6 percent from $609,315,000 reported for the first quarter in 1946. First quarter 1947 gross income, including other utility operating income, amounted to $249,168,000 and net income to $190,643,000, representing decreases of 2.4 percent and 2.6 percent respectively, from amounts of $255,296,000 and $195,650,000 reported for the first quarter in 1946.

Electric operating revenues in the month of March amounted to $297,824,000 compared to $266,149,000 in March, 1946. Revenue deductions for the month were $233,875,000, up 15.6 percent from last year. Gross income decreased 1.0 percent to $78,518,000 and net income 1.4 percent to $58,571,000.

WELCOMING CREW—Miss Mae Woods, center rear, secretary of the Edison Electric Institute, and her crew of assistants who handled the registration at Edison Electric Institute's Atlantic City convention this week

Monsanto Chemical Co. Abandons Operation of Oak Ridge Lab

AEC Seeks New Operator—Major Change Indicated in Emphasis of Atom Project—Lilienthal Objective to Make Country Atomicly Strong—Power Work Not Abandoned

THE Monsanto Chemical Co. has decided to quit its job as operator of the Atomic Energy Commission's Clinton Laboratory at Oak Ridge. AEC is looking for a new operator—perhaps another industrial firm, more likely a university or group of universities as at the Argonne and Brookhaven Regional Laboratories.

The shift at Clinton underlines a major change in the emphasis of the atom project—a change which has been gathering force for several months now.

AEC is gearing itself for an atomic armament race.

Administration policy is now based on the assumption that negotiations on the international control of atomic energy are getting nowhere. State Department and White House advisors are convinced that the Russians are stalling—perhaps until some time in the early 1950's when they have bombs of their own and can bargain on more nearly even terms.

This week AEC Chairman Lilienthal openly put the foreign negotiators on notice that he was setting out to make this country atomicly strong.

What this means to the atomic program is an increased emphasis on research and engineering that can show results—in the next two, three, or four years—in increased and improved production of fissionable material, of bomb stuff.

It means that last fall's preoccupation with industrial and beneficial applications of nuclear energy are moving into the background. It means that secrecy on atomic matters is being tightened rather than relaxed.

Power generation work has not by any means been abandoned. For one thing, at the present stage of development, there's practically no distinction between work on industrial power and work on atomic propulsion for ships or aircraft. And even where a distinction exists, much preliminary work can be done in utility-type power generation without serious conflict with immediate military projects.

Even so, construction of atomic central-station power plants now looks considerably farther away than it did a few months ago. Six to ten years away, Lilienthal now says, instead of the four or five years atomic engineers were predicting earlier.

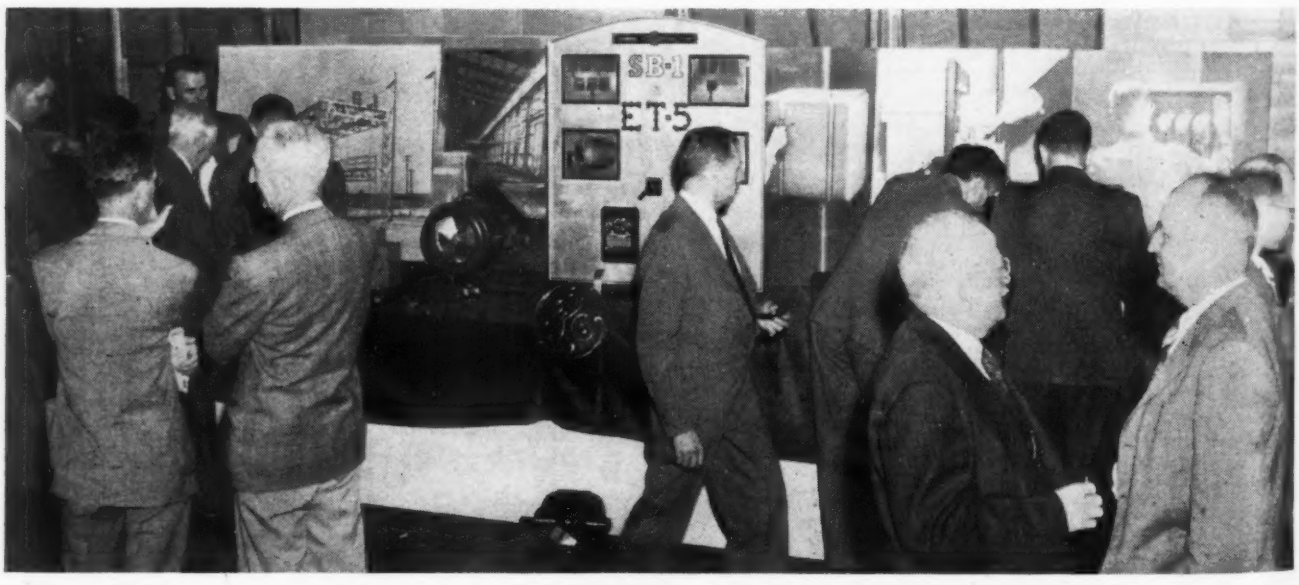
In the main, AEC is not so much changing the elements in its program as revamping it to telescope the time factors on the direct military applications and to stretch out the time factors on civilian application. Of course the change in timing can involve some substantial changes. For instance, the problem of whether to proceed immediately with construction of new plutonium production facilities or to go in for more elaborate engineering that would permit a multi-purpose job utilizing the byproduct power might well get a different answer in the light of the new policy.

The conflict between the military and civilian sides of the program is not a matter of money or of fissionable materials. Both are plentiful. It's a matter of skilled manpower. And particularly of engineering rather than scientific manpower — chemical engineering, metallurgical engineering, electronic engineering and the new art of nuclear engineering.

It's in industry that engineers are found. Thus, the current trend of AEC policy is to throw projects leading toward military objectives into the hands of industry, where early applications can be engineered on the basis of existing knowledge. Projects involving beneficient applications, by and large, are being routed toward the universities, which can work out underlying theory and make studies prelimary to actual design.

The whole shift is a matter of trend, of changing emphasis. There's no abrupt about-face, no sharp cut-off of any phase of the atomic program. One effect, nevertheless is to make atom work less attractive to industry.

Industrial firms which go into atom



EXHIBITION—One of the exhibits held at the Hershey Industrial School in connection with the recent Industrial Sales Conference of the Pennsylvania Electric Association at Hershey, Pa.

work make a substantial investment of managerial and technical talent, if not of money. And they make it, so far, on a non-profit basis. Profitwise, they're gambling that they can cash in on an insider's spot when nuclear energy achieves commercial importance.

Such firms are doubly hit by the new policy. On the one hand, they see the day of profits in atoms shoved farther into the future. And at the same time, the most profit-promising aspects of the job are increasingly routed toward the university researchers.

From another point of view, too, some industrialists are unhappy about the present trend. Although they admit the need for a recasting of the program, they doubt the wisdom of a mechanical separation between engineers and scientists. They argue that in many cases both basic research and engineering go forward faster if they enjoy the stimulation of inclusion in the same organization. Thus they feel that some research physicists will be less content and less productive on a university staff than they would be doing the same work in an industrial laboratory.

Monsanto will continue to run AEC's Miami works. Until a few weeks ago, no information had ever been released on the purpose of this project. In mid-May, in response to local protests against the dangers of an atom plant, AEC revealed that the laboratory would do basic research on chemical problems in atomics, would be completed early next year, and would have a staff of about 450 people, about half of them scientific and technical men.

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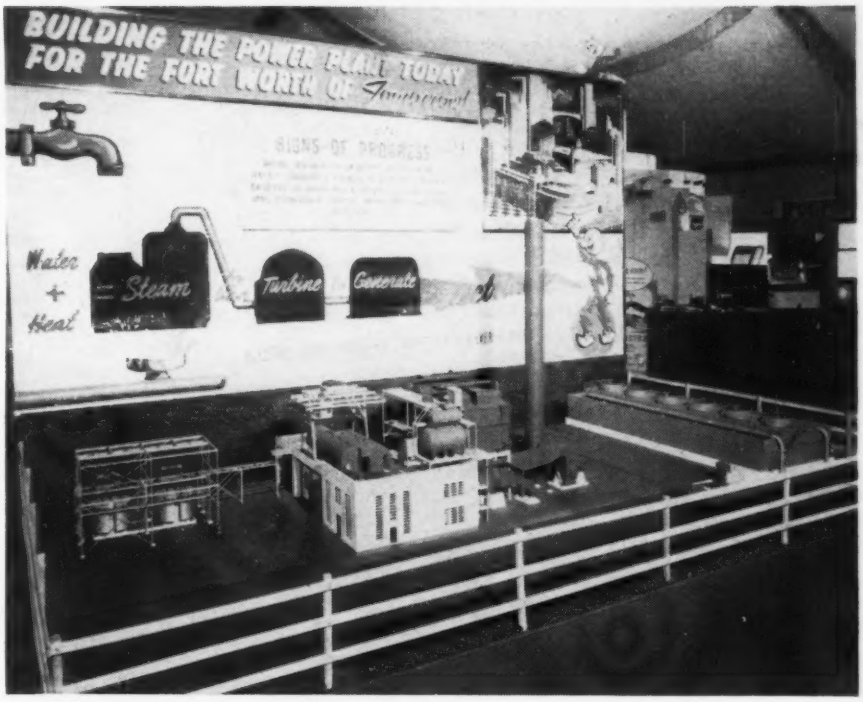
Legality of Georgia Power Pact with Union in Doubt

Georgia Power Co. and the International Brotherhood of Electrical Workers A.F.L., have signed the first known contract containing union shop, maintenance of membership, and check-off clauses since the passage of Georgia's new labor laws which forbid these practices.

The anti-closed shop law, vigorously opposed by all labor unions, was signed last February by Governor Thompson. It specifically bans any contract between unions and employers which limits employment to members or affiliates of labor organizations.

The new utility contract, which covers 2,071 employees of all categories in the electrical department, has a provision whereby any portion of the contract is automatically voided should the courts rule that any practice is in violation of the Georgia law.



TEXAS PLANT IN MINIATURE—The Texas Electric Service Co. displays a model of its Handley plant at the Texas Electric Show at Fort Worth

FPC Abandons Long Battle With Connecticut Utility

Concedes Case to Be "Border-Line"—Utility to Cease Interstate Energy Transactions Soon

Making another concession to its newly found talent for realism in regulation, the Federal Power Commission last week abandoned its seven-year-old effort to bring the Connecticut Light & Power Co. under its jurisdiction.

Thus ended one of the most spectacular cases in the Commission's history, one which had reached the proportions of a grudge battle. The company fought every step of the way, dropping operation after operation which it considered might make it subject to federal regulation. This "series of calculated actions," FPC finally admitted, had removed the company "from the jurisdiction of this commission."

But FPC insisted that for a number of years—until the company discontinued its last purchase of "interstate energy"—C.L.&P. was under the commission's jurisdiction and should have adopted the uniform system of accounts. During this period the company "successfully evaded compliance with the known requirements of the commission," FPC's opinion held.

The opinion indicated that it was within the commission's discretion to penalize C.L.&P. for such "evasion," but added that FPC could not see "how the public interest would be served by further proceedings."

Other recent rulings which have been interpreted in some quarters as examples of restraint on the part of the commission include three cases in which FPC acknowledged its lack of jurisdiction over producers and gatherers of natural gas. But in none of these, nor in the C.L.&P. case, did the commission give up any of the broad authority which it previously had claimed.

Before the Federal Power Act became effective, C.L.&P. began cutting its interstate connections. But early in 1942, after preliminary investigations and hearings, FPC claimed jurisdiction and ordered the utility to reclassify its books to conform with the uniform system of accounts. An appellate court upheld this order and the case went to the Supreme Court.

FPC based its original ruling on three major points: (1) C.L.&P.'s sales of energy to a Connecticut town, which resold a portion of this power for local distribution in New York State; (2) C.L.&P.'s participation in the Connecticut Valley Power Exchange, which FPC termed an interstate connection; (3) connection of the C.L.&P. system, at its substation in Bristol, Conn., with the Connecticut Power Co., which FPC contended transmitted energy generated in Massachusetts.

Since C.L.&P. had withdrawn from the Power Exchange and discontinued its sales for resale, the case centered about the Bristol substation operation. Devoting its opinion to that point, the Supreme Court held that the Bristol

connection was not subject to FPC jurisdiction and remanded the case to FPC for further proceedings.

Conceding that it was dealing with a "border-line case," FPC in its dismissal opinion declared that, in the light of the court's decision, a find of jurisdiction probably could not "now be properly made." Anyhow, FPC continued, by June 15, 1947, C.L.&P. would have its own source of energy supply for Bristol and would cease all "transactions in interstate energy." Therefore, the opinion noted, "any current or continuing federal jurisdiction over its accounts would in any event be terminated" on that date.

This language resolved another major issue at stake since the case was instituted—the question of whether the commission would attempt to maintain its accounting controls over a utility which was no longer a "public utility" under terms of the Federal Power Act. Apparently the commission, as presently constituted, at least, has no such intent.

FPC took some pains to dispute what it termed "certain unsound contentions" to the effect that the company had not been subject to federal regulation since ending its participation in the Power Exchange.

In drafting the Federal Power Act, FPC said, Congress intended to provide uniform accounting methods for utilities, as well as to close the gap between state and federal regulation of rates. Congress did not "regard the granting of concurrent jurisdiction over utility accounts as a usurpation of state authority," but rather as "an aid to the states," FPC argued.

But, the commission conceded, Congress did not forbid utilities to "terminate arrangements" which made them subject to federal regulation and C.L. &P. was "clearly within its legal rights" by taking such steps as to make it "wholly intrastate, subject only to the jurisdiction of the Connecticut Commission."

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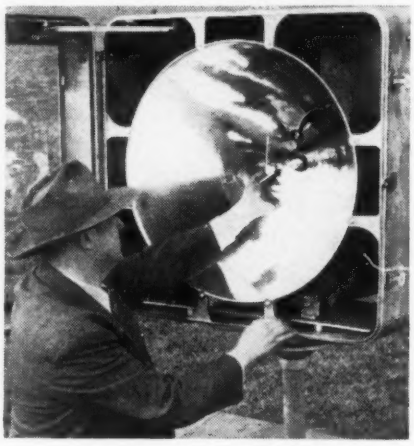
Counties Control Dams

Wisconsin counties now have the right to decide whether dams should be constructed within their borders under a law passed recently by the legislature. Electric cooperatives supported the measure, as it gives the county boards power to overrule the Public Service Commission, which has sometimes denied the co-ops the right to build dams which they had planned. The boards, however, must decide by a two-thirds vote in favor of a dam application before it can be granted over the objection of the commission.

3,300,000,000 Candlepower Lights Tested at Airport

A new all-weather approach light system which is effective through 1,000 ft. of the thickest weather, when objects 50 ft. away cannot be seen in daytime, has undergone tests on a partial system at the Cleveland Municipal Airport. The first full system is to be installed at New York City's Idlewild Airport within eight months.

The system, designed by Westinghouse Electric Corp., includes flash units, the brightest lighting units ever made, that will give up to 3,300,000,000 peak beam candlepower for use in zero-zero daytime, and blaze units that are controllable so they can be set to emit a soft red glow of about 100 cp. for use on clear, moonless nights. Between these two extremes are steps of candlepower suitable for any intermediate weather conditions.



3.3 BILLION CANDLEPOWER—This small krypton light, installed at the Cleveland Municipal airport for tests by Westinghouse Electric Corp., produces a flash of 3.3 billion candlepower

The approach light system consists of 36 krypton flash units placed in line alternately with 36 neon blaze units for a distance of almost three-quarters of a mile from the approach portal to the start of the runway. The krypton lamps are only 4 in. long; but when a surge of electricity heats the gas to incandescence, the lamp flashes with a maximum brightness of 9,000,000 cp. per square inch. The reflector and optical system of the lighting fixture magnifies this flash to 3,300,000,000 cp.

When flashed rapidly one after another, the line of lamps appears like a stroke of lightning traveling toward the airport landing strip. Flashing 40 times a minute, this line of vivid light can be seen for at least 1,000 ft. even in zero-zero visibility.

In clearer weather, intensity of the approach lights is reduced, and the krypton units can be turned off in favor of the neon blaze units that can be used as either flashing or steady-burning lamps.

Dondero Bill Hearings Set; Utility Men May Testify

House hearings on Rep. George A. Dondero's bill to stop Interior Department marketing of energy from Army-built hydroelectric plants were scheduled to start this week, but no major developments are expected before next week.

Already once postponed because of conflict with special morning sessions of the House, the hearings have been tentatively set for June 4, 5, 9 and 17. A number of witnesses are slated to testify on the measure, but the dates of their appearances had not been set by the committee early this week.

The committee has summoned representatives of the three Federal agencies most concerned—the War and Interior Departments and Federal Power Commission. Interior Secretary Krug and Arthur Goldschmidt, director of the department's division of power, will testify on June 17.

Representatives of the electric utility industry also have asked for time to testify, the committee announced. The industry witnesses are expected to appear next week. Washington and Oregon Congressmen, some of them concerned over the bill's effect upon the activities of the Bonneville Power Administration, also plan to testify, as had the Columbia Basin Commission.

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Tampa Electric Announces Plant Expansion Program

Tampa Electric Co. has placed orders for two additional generators and other equipment to increase its generating capacity to 148,500 kw. in a $9,500,000 additional power expansion program, according to Francis J. Gannon, president.

Mr. Gannon said that the new power plant now being constructed on Hookers Point and the installation of a new 30,000-kw. unit, at a cost of $5,500,000, will be expanded to provide for two additional 30,000-kw. units. Hookers Point is scheduled to go into operation in the summer of 1948.

New Bill Puts TVA on 40-Year Pay-Out Basis

Appropriations Bill Aims to Recover Definite Amounts Each Year, Require Authority for Improvements

A Congressional move to put power operations of the Tennessee Valley Authority on a definite pay-out basis is reported to be included in annual appropriations for that agency.

Sources close to the House managers of the Government Corporations Appropriations Bill, which includes TVA funds, assert that the measure will carry a plan for repayment of the federal government's investment in TVA power facilities over a period of 40 years. The bill is scheduled to be reported to the House next week.

Though full details were lacking, the plan was said to call for repayment of a total of $348,000,000 to the Treasury, a sum comparable to the recent General Accounting Office estimate of the government's investment in TVA for power (ELECTRICAL WORLD, April 5, Page 3). Incidentally, one of the major recommendations of the GAO report called for the establishment of "a definite repayment plan for power investment."

The House committee's bill is said to call for minimum annual repayments amounting to 40 percent of TVA's net power revenues during the fiscal year previous to date of payment. Thus the agency will be permitted considerable leeway in case of low-income years. But it will be required to return at least 25 percent of the total power investment within each of the next four decades.

Ten Million Repayment

Unofficial estimates fix TVA's net power revenues for the current fiscal year at approximately $20,000,000, which would mean that the authority will be forced to pay some $8,000,000 into the Treasury next December if the 40 percent plan of the House Committee is accepted by Congress. In addition, TVA is expected to return some $2,500,000 as principal and interest on its bonds during fiscal 1947, bringing the total repayment to $10,500,000.

Also partially in line with a GAO report recommendation, the committee is reported to have provided that all future capital improvements of TVA's power plant be undertaken only with Congressional authorization. This probably would mean that the authority would be forced to seek specific appropriations for new generators, transmission lines and other power equipment it plans to install, with the exception of replacement facilities.

Since several staunch supporters of the TVA are members of the appropriations subcommittee which drafted the bill, it is not to be expected that the agency's operations will be radically revised by such legislation. But constructive critics of the TVA program long have insisted that the authority could and should be subject to some definite plan for repayment of its power expenditures.

Under Section 26 of the TVA Act the Authority is directed to repay this investment but in such broad terms that its repayments to date have been left practically to the discretion of the TVA board. Two payments have been made under this provision, one of $12,597,000 for fiscal 1945 and another of $10,336,000 for fiscal 1946.

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TVA Power Suits Voters; Municipal Plant Downed

Because city officials of Tullahoma, Tenn., objected to signing the standard Tennessee Valley Authority contract which provides that the city must use profits from a municipal distribution system to reduce rates and extend service, they proposed a $600,000 bond issue to provide funds to construct a municipal generating plant. Voters defeated the proposal 1,147 to 49. The mayor and aldermen wished to place the profits in the general fund.

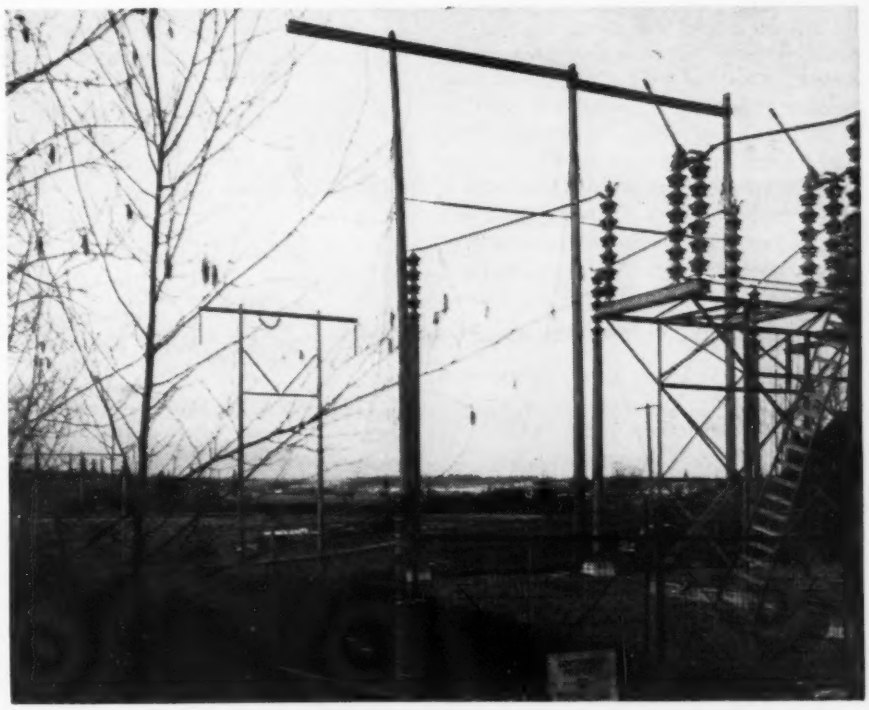
New 75,000-Kw. Generator Planned for Cleveland

An additional 75,000 kw. generator will be installed by the Cleveland Electric Illuminating Co. in its Lake Shore power plant, Cleveland, in 1950, Elmer L. Lindseth, president of the company, has announced.

Work is under way at the present time on an addition to the company's Avon power plant in Avon Lake, which will include two 90,000 kw. generators, the first to be put into operation in 1948 and the second in 1949. The three generators together will increase the company's power production capacity to 1,059,000 kw.

Total cost of the newly announced installation at Lake Shore power plant, including an addition to the building, another boiler and auxiliary equipment, will be about $8,000,000. This will increase the company's current construction budget to $65,000,000, a sum equivalent to more than a third of the company's present total investment in plants and properties.

In announcing the Lake Shore addition, Mr. Lindseth said, "Although present construction costs are exceedingly high, the Illuminating company as always is going ahead with providing all facilities required to continue to give Cleveland and northeast Ohio adequate, dependable electric service. With the



WHERE POWER CROSSES THE BORDER—Switching station at Blaine, Wash., looking across the border into Canada and showing the line of the British Columbia Electric Railway Co. that will connect with the Bonneville 230-kv. circuit from Arlington to Blaine

best possible electric service vital to the growth of the area we serve, we are not deferring provision of essential facilities in expectation of lower costs.

Mr. Lindseth emphasized that long delays are still being experienced in delivery of electrical equipment of most categories, and that the company necessarily is being forehanded in preparing now for installation of the third generator in 1950, three years away.

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REA Proponents to Appeal for Additional Funds

Proponents of the Rural Electrification Administration are drafting a strong appeal to the Senate to add more funds for that agency when it takes up the annual Agricultural Department Appropriation Bill.

And the odds are strongly in favor of their winning a substantial boost—upwards of $25,000,000—in the $225,000,000 lending fund approved for REA last week by the House. It seems likely, also, that the Senate will make a proportionate increase in the $4,000,000 allotted to REA by the House for administrative expenditures during fiscal 1948. As yet, there has been no unfavorable reaction—not even from REA—to the House proposal that the agency borrow all its loan funds directly from the Treasury rather than from RFC.

Led by such veteran public power enthusiasts as Reps. John Rankin and Will Poage, REA's adherents made two nearly successful efforts on the House floor last week to make additions to the sum allotted the agency by the Appropriations Committee. An amendment to raise REA's loan funds to $300,000,000 and its administrative allotment to $5,600,000 was the first defeated, by a vote of 144 to 159. Much closer—174 to 180—was the vote to reject a motion to recommit the entire bill to committee with instruction to increase three items, one a boost of REA moneys for loans to $250,000,000.

There was little or no comment on the Appropriations Committee's legislative provision instructing REA to borrow directly from the Treasury, starting July 1. Even had there been criticism, it would have been futile after the House accepted a rules committee decision waiving all points of order against the bill.

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Will Use Heat Pumps

Alabama Power Co. is building an annex to its general office building in Birmingham and will heat the annex with heat pumps.

Urge St. Lawrence Plan As Vital to Nation's Security

Proponents of Vandenberg Bill End Testimony—Opponents to Be Heard by Committee Next Week

Senate hearings on the Vandenberg Bill to authorize construction of the St. Lawrence Seaway project reached the half-way mark early this week, with proponents of the measure winding up their testimony.

The Foreign Relations subcommittee conducting the hearings set June 11 for the start of testimony by the opponents, who are expected to be permitted at least two days. Backers of the Vandenberg Bill already have spent portions of two days before the subcommittee and have been assigned additional time for testimony by the Secretaries of Commerce and Interior and a representative of the Army's Corps of Engineers.

Chances of Senate action on the bill still are dim, though a favorable committee report is expected before the end of the present session.

Favorable testimony by "big-name" witnesses, headed by Secretary of State Marshall and former President Herbert Hoover, marked the initial hearings. These speakers urged construction of the project as vital to national security. Other witnesses favoring the legislation included Federal Power Commissioner Leland Olds, Chairman Wilby of the New York Power Authority, Under Secretary of War Royall, and representatives of the National Grange, American Farm Bureau and of municipal and industrial interests of the Great Lakes area.

Commissioner Olds, devoting his remarks to the power production possibilities of the project, warned that "there is already a potential power shortage in many parts of the country, which might develop into an actual one unless the utilities can get deliveries of additional generating station equipment more rapidly than seems presently possible."

Studies by the FPC indicate tremendous increases in the area's power loads within the next 13 years, he added. "Including presently available generating facilities, plus new generating capacity now on order and scheduled for future delivery, but excluding power obtained from emergency diversion at Niagara Falls, plus that imported from Canada, the following additional generating capacity will be required to serve the estimated loads: 1950—1,449,000 kw.; 1960—3,449,000 kw."

Seaway power will be "remarkably low-cost power," which probably can be generated "at $10.91 per installed kw. per year," Commissioner Olds said.

The power market "within feasible transmission distance" includes New York, all of New England except Maine, northeastern Pennsylvania and northern New Jersey, he asserted. "Including reasonable transmission costs and allowance for losses," St. Lawrence power could be delivered throughout this area on an 80 percent load factor basis for about 3.1 mills per kw.-hr.

MEETINGS

Previously Listed

American Society of Refrigerating Engineers—Spring Meeting, Hotel Alexandria, Los Angeles, June 9-11.

American Management Association — Conference on General Management Problems, Waldorf-Astoria Hotel, New York, June 11-12.

American Institute of Electrical Engineers—Summer General Meeting, Mount Royal Hotel, Montreal, Que., June 9-13; Pacific General Meeting, San Diego Hotel San Diego, Calif., Aug. 26-29.

American Society of Mechanical Engineers—Semi-annual Meeting, Stevens Hotel, Chicago, June 15-19

American Society for Testing Materials—Fiftieth Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, June 16-20.

Public Utilities Advertising Association — Annual Convention, Book-Cadillac Hotel, Detroit, June 18-19.

Canadian Electrical Association—Annual Convention, Algonquin Hotel, St. Andrews, N. B., June 18-20.

SEC RULINGS

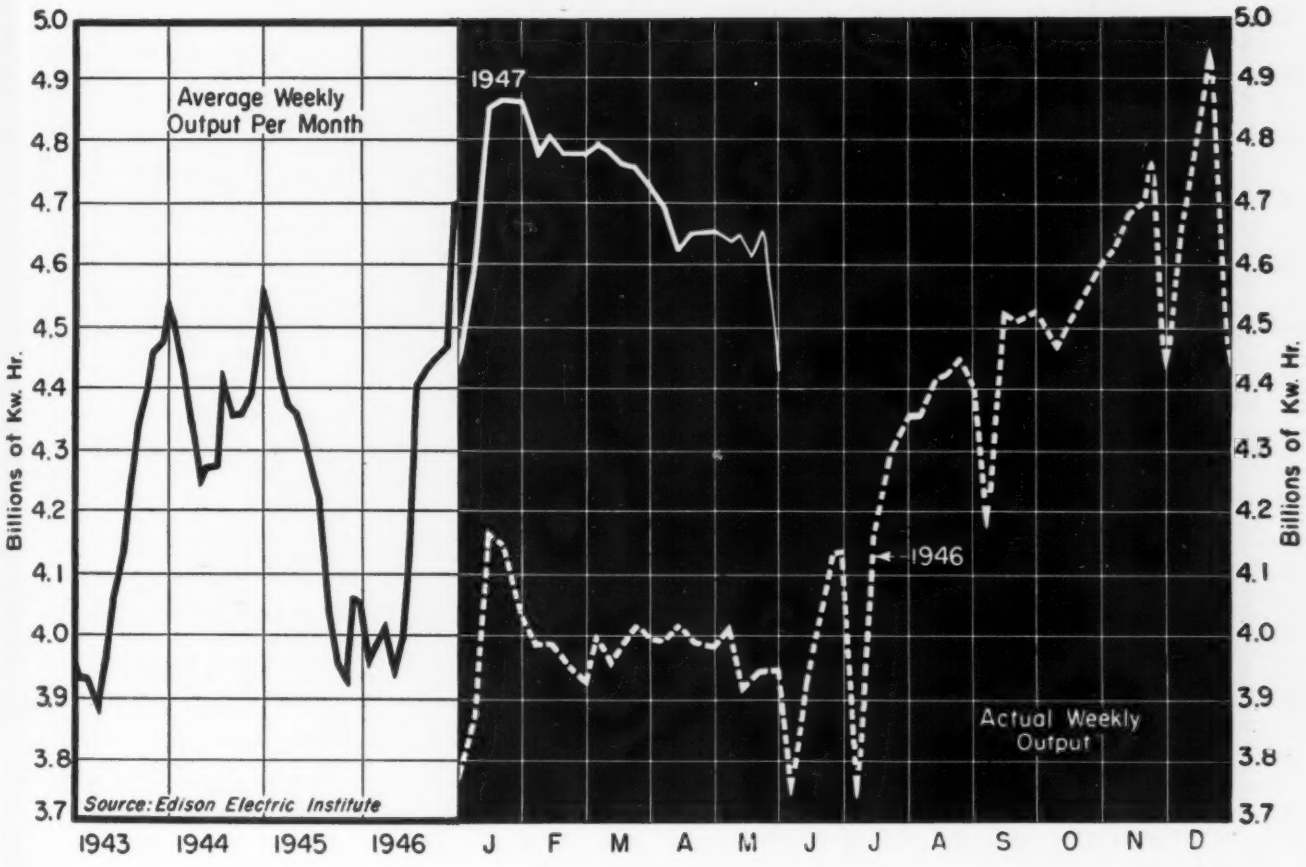
The Securities and Exchange Commission recently issued a series of orders affecting electric utility companies.

Nassau & Suffolk Lighting Co.'s proposal to issue and sell to two commercial banks an aggregate of $500,000 principal amount of eleven-month notes, bearing interest at 2 percent, has been approved. (Release No. 7420).

Long Island Lighting Co.'s proposal to issue and sell to four commercial banks $5,000,000 principal amount of eleven-month notes bearing interest at 1¾ percent has been approved. (Release No. 7419).

Standard Gas & Electric Co. has been granted an extension to July 10 of the maturity of about $8,000,000 of bank-loan notes maturing on May 10. The company proposes to meet the forthcoming maturity by use of the proceeds of the proposed sale of its holdings in California Oregon Power Co. (Release No. 7395).

Delaware Power & Light Co. and its subsidiary Eastern Shore Public Service Co., received approval of their joint application, whereby the latter would sell before Dec. 31, 1948, $2,000,000 of 3½ percent promissory notes due on Oct. 1, 1973, and 20,000 shares of $100 par value common stock. Most of the proceeds would be used by Eastern Shore to finance construction. (Release No. 7414).



Municipal Workers Strike; BPA Supplies Ellensburg

Eleven employees of the Ellensburg, Wash., municipal light department walked off their jobs May 15 when the City Council refused to grant all of them wage increases of $25 a month.

One lineman and two meter readers refused to join the walkout, and Light Superintendent Lewis Ambrose said he had been able to hire one ground man and had a sufficient crew to handle emergency situations. Included in the employees who quit were all four operators at the municipal hydroelectric plant. As a result, the city is getting its entire power supply from the Bonneville Power Administration. Ambrose was advertising for linemen at a wage of $275 a month, $25 over the previous wage scale, and for operators at $200 a month, a $5 increase. Operators get living quarters without charge.

The city administration had offered the $25 increase to all employees except the plant operators, but the employees rejected the offer.

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John W. Hubbard Dies

John W. Hubbard, Pittsburgh industrialist and chairman of Hubbard & Co., died on June 3 in Atlantic City (N. J.) Hospital where he had been a patient since mid-May. He was 82 years old. Mr. Hubbard started in his father's small shovel factory in 1887.

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January Electric Energy Sales Rose 16.2 Percent

Sales of electric energy to ultimate customers in January, 1947, totaled 18,320,092,000 kw.-hr., compared with 15,757,071,000 kw.-hr. in January, 1946, Edison Electric Institute reports.

Classification of Sales, January, 1947 and Change from 1946

Kilowatt-Hour sales January	Million Kw.-Hr. 1947	1946	% Change
Residential or domestic	4,149	3,658	+13.4
Rural (distinct rural rates)	291	242	+20.2
Commercial or Industrial			
Small light & power	3,175	2,755	+15.2
Large light & power	9,219	7,595	+21.4
Street & highway lighting	233	229	+ 2.0
Other public authorities	511	527	— 3.2
Railways & railroads			
Street & interurban	437	451	— 3.2
Electrified steam railroads	237	242	— 1.8
Interdepartmental	51	57	—10.6
Total to ult. customers	18,302	15,757	16.2

For the twelve months ended January 31, 1947, the average use per customer advanced to 1,340 kw.-hr. from 1,244 kw.-hr. for the preceding year, an increase of 7.7 percent; the average annual bill rose slightly to $42.88 from $42.17, an increase of 1.7 percent; revenue per kw.-hr. dropped to 3.20 cents from 3.39 cents, down 5.6 percent.

Output Drops Sharply

The electric output curve dropped sharply during the week ended May 31, 1947, which contained the Decoration Day week-end, according to figures released by the Edison Electric Institute. The amount of electric energy distributed by the light and power industry during the week totaled 4,429,109,000 kw.-hr., the lowest point recorded since mid-September, 1946. It compares with 4,662,858,000 kw.-hr. during the preceding week and with 3,741,256,000 kw.-hr. during the corresponding week of 1946, this year's figure representing an increase of 18.4 percent.

Weekly Output, Millions Kw.-Hr.

1947		1946		1945	
May 31	4,429	June 1	3,741	June 2	4,204
May 24	4,663	May 25	3,942	May 26	4,330
May 17	4,616	May 18	3,939	May 19	4,377
May 10	4,653	May 11	3,911	May 12	4,302
May 3	4,640	May 4	4,012	May 5	4,397
Apr. 26	4,668	Apr. 27	3,977	Apr. 28	4,416
Apr. 19	4,660	Apr. 20	3,987	Apr. 21	4,411
Apr. 12	4,620	Apr. 13	4,015	Apr. 14	4,332
Apr. 5	4,693	Apr. 6	3,938	Apr. 7	4,322
Mar. 29	4,729	Mar. 30	3,992	Mar. 31	4,329
Mar. 22	4,759	Mar. 23	4,017	Mar. 24	4,402
Mar. 15	4,764	Mar. 16	3,988	Mar. 17	4,398

Percent Change from Previous Year

	May 31	May 24	May 17
New England	+ 4.2	+ 8.6	+ 5.9
Mid-Atlantic	+ 9.5	+12.3	+ 9.2
Central Industrial	+21.0	+18.6	+18.9
West Central	+21.3	+14.2	+14.9
Southern States	+23.8	+23.7	+23.6
Rocky Mountain	+ 6.7	+15.2	+19.2
Pacific Coast	+23.8	+23.2	+19.1
Total United States	+18.4	+18.3	+17.2

Electrical World
OPINION

Fill the Bases or the Jails?

YOUNG desperadoes stealing cars, juveniles involved in burglaries—even murders—are commonplace. Juvenile delinquency is a major American problem today. It takes no genius to realize that one effective way to combat juvenile delinquency is to increase the supervised activity which recreation departments in most communities now provide. But existing facilities are often inadequate. Recreation directors and law enforcement agencies agree that one of the best means of reducing juvenile delinquency is to provide an active sports program for the kids, giving them some means of working off excess steam —under control.

Unfortunately, use of most outdoor playgrounds and recreational areas is limited to daylight hours, while the evening hours may be the most conducive to the trouble-making which is frequently the beginning of crime. Realizing the urgency of the problem, Attorney General Tom Clark recently outlined to half a hundred sports writers and editors from 24 states a program designed to get every youngster in the country into competitive athletics.

If more outdoor recreational areas—such as baseball, softball and football fields, tennis and badminton courts, horseshoe pits and swimming pools—were to be lighted, and the supervised programs were extended through the evening hours, the effectiveness of the recreational facilities in combating juvenile delinquency would be greatly increased. Lighting, inexpensively and conveniently, can extend the use of present facilities into perilous evening hours. The electrical industry has a responsibility and an opportunity in the promotion of lighting for sports and recreation. Fill the bases—not the jails!

Masters of Employee Relations

FOR SOME TIME, ELECTRICAL WORLD has attempted to emphasize the need for good employee relations as an indispensable forerunner to good labor relations, company morale and employee performance.

It seems to us that, unusual as the case is, the actions of the Monsanto Chemical Co. immediately following the disaster which levelled its Texas City plant, are superb examples of the ultimate in favorable employee relations.

Within hours after the disaster, Monsanto's president and another top executive were flying over the scene. Inspection was followed by specific attempts to mitigate the misfortunes of the victims, including the following:

Payment of $1,000 in cash to each widow or nearest dependent of a deceased employee. Granting of "liberal authority" to Monsanto executives to care for "special hardship cases." Payment of hospitalization costs uncovered by a hospital plan. Guarantee of full base salary during hospitalization and convalescence. "Individual and liberal" consideration of all permanently disabled employees, beyond the legal limit of liability. Immediate, company-organized repairs to 148 damaged homes of employees. Transportation of the dead, their families and effects, to former homes, if desired. Company guarantee against the loss of equity in an employee's home if survivors chose to move away. Guarantee of wages through a specific date. Thereafter, company efforts to provide them work in the reconstruction.

All these were in addition to such standard employee-benefit programs as a company-sponsored group insurance plan and complete protection under Texas' workmen's compensation laws. In some cases, payments under these began within 48 hours. Monsanto's directors authorized an emergency fund of $500,000 for relief of its Texas City employees, and organized contributions in Monsanto plants.

Obviously, few companies will ever face such a tragedy as struck Monsanto and its people at Texas City. But those who face employee problems of any seriousness with a comparable spirit will have mastered the first and most vital fact about good employee relations—a sympathetic understanding of, and help to, real employee problems.

"The Public Distrusts . . ."

BUSINESS AND INDUSTRY have a shock coming when they read the results of a survey by Opinion Research Corp. for the Controllorship Foundation, Inc., a non-profit group for business and economic study.

Using "accepted techniques of measuring public understanding, and testing popular acceptance of ideas and information," the survey finds:

1. "That the public has an erroneous impression of the amount of profit made by business firms;

2. "That a considerable section of the public does not understand the terms in which business reports are couched, even though they are sanctioned by long use;

3. "That, in spite of certified audits and all the safeguards imposed by federal and state laws, and by regulations of the securities exchanges, a substantial percentage of the public distrusts the financial statements of business."

If these conclusions be accurate, American management certainly has a job to do—the education of the American public. Granted this will be a difficult job. But

perhaps it will be less overwhelming than it appears. What, after all, is the public but a large number of somebody's employees? Suppose each management were to take —and complete—the responsibility for educating its own people. Then the task would be much less imposing.

For the electric power business, any such public feeling on a substantial scale is doubly bad. This industry is a prime target for public ownership, which can come only with broad public acceptance of the principle. Such broad acceptance does not exist today. Yet the industry is fighting public ownership before national and state legislative bodies, which, in the last analysis, are governed quite closely by public opinion. Now, if the industry be the victim of such public misinformation as this survey indicates—and on anything so basic as common honesty—what can it expect of uninformed public opinion on the involved issues it is trying to advance?

Isn't this survey a question for the industry's advertising group to look into? If it be deemed accurate, isn't it a fit subject for the attention of an enlarged, solidified advertising group?

Target for Nationalization

IT will take another 30 years to determine whether the United States' electric power industry will match, exceed, or fall short of the dimensions projected for it in 1976 by Elmer Lindseth's recent paper before E.E.I.'s 15th annual convention.

It doesn't take so long to realize that the industry is big and growing bigger, and that if it be a target for nationalization at its present size, any increase in proportions will only serve to spur the efforts of those who would capture such a plum for their own.

Completely arbitrarily, Lindseth assumed a growth rate for the industry's next 30 years at 50 percent of that achieved in the last 30 years. This projection shows a 1976 plant capacity of 250,000,000 kw. Now, who in the electric power industry today comes closest to thinking in these terms—the federal public ownership people or the private ownership people? The answer is too obvious to require spelling out. Yet the surest road to nationalization of power, if it ever be achieved, is for private ownership to fall down on its job—something it has never done.

Projected 1976 revenues are $14 billions. Think what government could do with the untaxed net from such revenues. Such a sum might carry a substantal portion of the annual $5 billion debt service charge which is Item No. 1 in every federal budget. True, this is not government philosophy today, but Britain achieves just this with its power nationalization program.

Such reasoning does not imply agreement or disagreement with the projections, which Lindseth was careful to point out were based on a purely arbitrary assumption. But it does indicate how growth of the industry makes it an increasingly attractive target for nationalization.

WASHINGTON COMMENT

By R. N. LARKIN

NOW THAT the House Appropriations Committee has solved the great puzzle of REA loan funds for the coming fiscal year, those who remain interested in the government's rural electrification activities will want to take a long look at other aspects.

Failure to cut the loan funds hard ought to embarrass a few people who predicted it even though they should have known better. It will be no humiliation to those strong supporters of REA who predicted for months that cuts of $125,000,000 or more would be made by the House committee. They knew what they were saying, and said it purposefully—in an attempt to minimize the tiny cut which they all knew must come. Palatable or not, the fact remains that too many farmers vote in too many election districts for economy to be practiced meaningfully on REA distribution line loan funds. Under representative government, such an assertion is no slur.

The bill treated one aspect of REA operation which has been discussed only briefly in recent years—the agency's relations with established, self-supporting borrowers. It cut REA's "housekeeping" appropriation from a budgeted $5,600,000 to $4,000,000, directing that the difference be absorbed by withdrawing services REA offers established cooperatives. The committee has complained of REA's "spoon-feeding" co-ops which are going concerns. Here, the committee followed a trail which both REA and many of the companies long have trod. REA policy is to bind the co-ops closely to Washington. Policy of many operating companies which deal daily with co-ops has been to attempt to wean them away from Washington. The effort has been to convince the owner-operators of rural systems that they can do effective business with utility companies without sending every piece of paper to Washington. In places it has worked, as the periodic attacks of Administrator Wickard testify.

In its report, the committee made some recommendations regarding loans by REA for generation by cooperatives. It suggested that an "appropriate agency, either in federal or state government," have a veto over such allocations. This problem has been a major one for several years, and the committee's report shows that no more realistic thinking concerning it has been done this year than was done in earlier sessions—when there was none. Aside from the philosophy which keeps entangling this question, the fact remains that Congress isn't yet in business to remove what little direct competition exists in the rural electric power supply business, particularly when such removal could react to the real or imagined harm of the farm voters. Some one may work out a politically acceptable "no-generation" amendment one day. It hasn't appeared yet.

THE PRESIDENT REPORTS...

THE GROWTH of demand for electric service outraces the estimates of even its own boosters. We are part of an industry that has not yet fathomed the limits of its usefulness. The December, 1946, peak load for the nation at large and the kilowatt-hour output of that month were well above the highest corresponding figures during the war period, and the present demand continues to run considerably ahead of last year.

Several factors are contributing to this sharp growth of peak load. Industrial activity is at a high level. But many manufacturing establishments are operating only one shift per day, five days per week, whereas during the war most of them operated around the clock. This has produced sharper demands on our power systems. The ratio of kilowatt-hours to manhours in manufacturing has increased 11 percent since 1939.

Capacity to Serve

This rapid post-war growth of load on power systems, before the electric companies have been able to put in operation new generating capacity, although some of this was ordered about the beginning of World War II, has sharply reduced the industry's margin of spare and reserve generating capacity.

The outlook for the fall of 1947 is for somewhat narrower margins in general than obtained in December, 1946, but that the generating capacity will meet the demands of our customers throughout the nation with possibly a few minor exceptions for short periods. The outlook for 1948 is that the gain in added capacity will exceed the expected load growth by a considerable amount. The outlook for 1949 is for a further substantial gain in the margin of reserve and spare capacity, but it is expected that it will take three or four more years beyond that date before the companies will have reestablished comfortable reserve margins.

Apropos the prospect for another seven to nineteen months of rather narrow margins of reserve and spare capacity, I should like to make two observations. The men who operate the power systems really are the big factor in maintaining an adequate supply of electricity to the public. It is the capable and resourceful teamwork of our operating forces in pooling their information, their capacity and their reserves, in scheduling their maintenance work and performing miracles in making repairs and keeping generators, turbines and boilers on the lines, that has supplied and will continue to supply the power demands of our customers, even though we are operating with limited reserves. The next point I want to bring out is that the electric utility companies will install additional generating capacity in the spots where it will best serve the public, and they will do it with more speed and skill and at less cost than any other agency or agencies could accomplish it.

GROVER C. NEFF

President of Edison Electric Institute in the current administrative year 1946-47 and president of the Wisconsin Power & Light Co., Mr. Neff entered the utility field as resident engineer on construction work in Wisconsin. After holding various operating positions with Wisconsin properties, in 1924 he was appointed vice-president of the Wisconsin Power & Light Co. He became president of the company in 1933. Mr. Neff is widely known for his contributions to the movement for farm service

Our industry pioneered in rural electrification. It built the first farm electric lines and has always been a leader in that activity. Our industry is definitely committed to a policy of positive action until this job is completed.

Comprehensive Rural Policy

As of June 30, 1947, 78 percent of the farms of this country will have electricity available; by the end of 1948 the percentage will rise, on the basis of present private and REA commitments, to 89 percent. With 95 percent as the practical upward limit, we can see that the period of large scale farm electric line building is rapidly drawing to a close.

The concept of farm electrification involves much more than just line building. We will miss the entire point of the line construction phase of rural electrification if we fail to think in terms of maximizing the use of electric service once we get it to the farm.

Improved designs for farm equipment, machinery, tools, and other equipment that will efficiently use electric power will be developed only through research. This research work has failed to receive the attention it deserves, primarily because of the emphasis that has thus far been placed on line construction. Now, as we approach the end of this phase, greater emphasis needs to be placed upon the farm uses that are to be made of electricity. When we do that, we will really be well on the way toward completing the job.

Looking some distance ahead for American business, it seems clear that if the free enterprise system is to continue to be successful, it must provide an opportunity for enterprisers, wage earners, and professional people to earn a good living.

Strange as it may seem, the most serious threat to the successful working of the free enterprise system

GROVER C. NEFF • President, Edison Electric Institute*

comes from government itself. Having had a system under which this country, in a relatively few decades, has become the envy and wonder of the whole world, we now find our government in active and unfair competition with the governed. Complicated, confusing, unnecessary regulation and high taxation of the enterpriser, while tax-financed but virtually tax-free agencies of the government directly compete with him, make enterprise no longer free.

In earlier days, some over-ambitious enterprisers who had developed large and prosperous businesses would kill competing small businesses by subsidizing the competing situation until the competitor quit. This was not fair or right, so our government properly put a stop to it by passing certain regulatory laws. Now the very government that passed these regulatory laws is doing the same thing it prohibited its citizens from doing.

The Employee

I want to make it very clear that if the free enterprise system is to continue, all personnel of electric service companies, both management and labor, must habitually keep their relations with one another above the plane where governmental authority is impelled to step in to regulate relationships.

If we are to have that kind of service from our personnel, they must be well paid in comparison with payments for similar work in the same areas, and they must be given recognition for achievements and opportunity for advancement. They must be well informed not only with respect to their particular jobs but about the company's business as a whole, the company's policies, its objectives, its plans and programs.

It has become increasingly clear that of all the strikes which the American people have had to experience, those which cut off electric service are the most upsetting. The prompt reaction from many quarters has been the desire to ban strikes in public utility industries. Rather we must work out the differences between management and labor in the electric service industry by collective bargaining, and if this is to be successful over a long range of time, it must be sound and fair bargaining which correctly takes into account the interests of the two parties not at the bargaining table—the investor and the consumer.

The Investor's Interest

The free enterprise system falls to the ground without the investor. Capital must be offered what it considers fair wages and fair working conditions, or it is not forthcoming. For nearly two decades in this country the investor has had scant consideration from the tax gatherer and inadequate consideration from the labor which it employs. Our industry is embarked on a huge construction program which we are carrying forward faster than ever before in history. It will require billions of additional money. How does our industry appear to those with money to lend? Investors can see that there is a problem ahead for management if their investment in our securities is to be safe in the coming years. It is in the best interests of the consumer and of the average employee that proper consideration be given the investor. We should take the necessary steps to see that our employees and the customers understand this.

Let us look a few moments at what has been done and is being done by the industry for the satisfaction of the consumer. We have continued to improve the high reliability and other standards of service to the customer. We have furnished adequate power supply, even during the war. About 92 percent of the occupied homes in America have electric service, and power lines reach another 4 percent. In a couple of years we will be serving 95 percent and reaching 98 or 99 percent. I have already told you about the rapid progress in extending electricity to farms. The application of electricity on the farm is expanding, electrification in industry is accelerating, and our commercial advisors tell us there is no end yet in sight for the uses of electricity. The average price of electricity to the residential consumer has gone down 20 percent since 1939. Using 1913 figures as an index of 100, the index number for electric service cost stands at 37, whereas the cost of living stands at 220 and cost of taxes stands at 430. Data on the hourly wage rate prior to 1933 are not available, but since that year, the average rate has doubled. Thus the electric industry has served the consumer well, but the companies' efforts on his behalf are not stopping with that.

Discriminatory Taxes

Electric utility companies in 1946 paid 19.4 percent of their gross revenues in taxes, and 11.4 percent of the gross revenue was federal taxes. All government power projects and most cooperatives escape these federal taxes. Since taxes eventually bear their full weight on the consumer, the federal government is in fact discriminating against certain consumers of electricity in favor of certain other consumers of electricity. A national government which undertakes to assure "equal justice for all" surely will not long continue this harsh discrimination. The discrimination goes even further than I have stated, for there is double taxation of security holders of electric companies, whereas the bonds of governmental bodies in the power business are tax-free.

There have been press reports that Congress plans to overhaul its tax legislation and that this would be undertaken when current legislative measures are out of the way. When Congress undertakes such overhauling, we may hope it will correct the heavy penalty against free enterprise in existing tax laws and will grant equality of treatment.

* Abstract of address to 1947 convention, Edison Electric Institute.

Pitfalls In the British System

THE BILL TO NATIONALIZE the power industry in England has passed the House of Commons and will come before the House of Lords this summer. It is unlikely that they will throw it out. The Lords are almost certain to send it back to the Commons with a number of amendments. If these drastically alter the Bill they will be rejected. The Bill will then go back to the House of Lords and . . .

I prefer to leave that sentence unfinished; my boldness does not run to prediction in the present state of affairs in Great Britain.

Socialists are all out to smash the capitalist system as at present applied to key industries. At the same time they are after monopolistic control of them.

Socialist Power Politics

Their design is not to put the electricity industry under the control of a democratically elected Parliament. It is to become a permanent asset in Socialist power politics. They are setting themselves up as the new capitalists.

Unscrupulously extracting the purchase price from the taxpayers, they nevertheless propose themselves retaining all voting and controlling rights. This fact emerges quite clearly from the composition of the committee just appointed to give form and finish to the reorganization proposals. Mr. Emanuel Shinwell, proudly boasting lifelong agitation and frankly admitting no knowledge at all of the electricity industry, will be its supreme head as soon as it becomes state owned. He it was, as Minister of Fuel and Power, who announced the new Electricity Organizing Committee in the House of Commons.

Chairman is Lord Citrine, former General Secretary of the Trades Union Congress. Before that he was assistant general secretary of the Electrical Trades Union. And before that, Mersey District Secretary of the E.T.U.

WADE H. HAYES

His active military career was in the U. S. Army in the first World War, for General Hayes is American-born. He went to England in the early twenties when the Utilities Power & Light Corp. acquired control of a group of power companies there. Following return of them to English ownership, General Hayes remained and became in time managing director of Edmundsons. When invasion threatened England in 1940, General Hayes commanded a home guard group he had organized among Americans in London

In the eyes of a Socialist Minister of Fuel and Power these trade union credentials apparently rank as adequate qualification for the managing directorship of a £1,000,000,000 industry.

Reasons for Such Happenings

Before dealing with the pitfalls inherent in what is to be the new British system, let me try to sketch in the events leading to the sorry mess. On the Socialist side they have all been positive; on the free enterprise side, entirely negative.

For the last half century the Socialists have been steadily and unceasingly propagating the theory that private profit is contrary to public interest. This propaganda was kept up even during the war, with the knowledge and consent of the Socialist leaders serving in the Coalition Cabinet from 1940 to 1945. This is not an assumption. It is a fact, frankly acknowledged by Prime Minister Attlee.

The Socialists refused to agree to a *political* truce during the war. They agreed only to an *electoral* truce. This meant that neither party contested parliamentary seats when they became vacant.

They were helped tremendously by the trade unions, whose active members were generally shop stewards, and therefore favorably placed for influencing the workers—including vast numbers of women who were drafted into industry and qualifying for the vote for the first time.

Socialist Propaganda

The Trades Union Conference continued to meet yearly. They played a vital part in shaping the wage earners' attitude towards political questions. T.U.C. leaders and Socialist Party leaders were able to hammer out an agreed policy so that they had something concrete to offer the public just as soon as an election became possible.

The Conservative Party, on the other hand, stopped every kind of political activity and concentrated exclusively upon the immediate business of winning the war. This total subjection of party loyalty to national salvation was a magnificent gesture. It may well yield a handsome return in good time.

But there can be no gainsaying that the first result was catastrophic to the Party's political interests. Not only had they no time before the General Election was upon them to prepare a policy and program rivalling the Socialist's. They lacked the means of reaching the public with effective propaganda.

In relying upon Winston Churchill's immense reputation as a war leader they overlooked the years of underground propaganda in the factory and workshop which paid

GENERAL WADE H. HAYES • Managing Director, Edmundsons Electricity Corp., Ltd.*

tribute to him as a military hero but derided and slandered him as a politician.

The Conservative Party's patriotism may have been carried to unnecessary extremes, but I cannot help feeling that the major blame for the success of the Socialist campaign lies with leaders of the industry. They had it in their power to counteract the politically disruptive activities of the T.U.C. Instead, they buried their heads in the sand and refused to admit any connection between politics and industry.

Political Industry

With a pigheadedness astonishing in a race of really brilliant industrialists they have refused to square up to the fact that Socialists have been teaching the workers for years to believe that industry can be made the instrument of political policy. During the war, and with more elaborate insolence during the general election, the Socialists described every industrial achievement as the direct result of government control.

They further argued that what could be done in the haste and flurry of war could be still better done by a *people* and *government* unharrassed by enemy action. Going still further, they claimed that if the people *owned* the basic industries they would get all the profits as well as all the service. They would be immune from the risk of unemployment, since they would be their own employers; they would avoid the booms, which filled the rich mens' pockets, and the slumps, which brought starvation to the workers.

This poisonous drivel was poured into the ears of the workers throughout the war.

How to Forestall?

The electricity supply companies afford an example with which I am most familiar. There can be no shadow of a doubt but that these companies have done a fine job of work. Their record will compare favorably with the industry in any part of the world. It would have helped to forestall their enemies to have shouted that from the housetops. It was not even whispered.

They have been perniciously misrepresented to the people of Britain as monopoly racketeers who have held up any development which did not guarantee huge and unreasonable profits. Nothing could have been easier than to disprove such charges. Nobody attempted to do so—until Edmundsons gave the lead.

And then amazingly enough, the matter was impertinently raised in Parliament. A Socialist member actually questioned the right of my corporation to spend our own money in publicizing the merits of our own service. That is a significant sidelight on the mentality of the people with whom we have to deal.

The story we had to tell—not only of Edmundsons Corp., but of the industry as a whole—was one of continuous progress, improving service and reducing prices. We had to correct the absurd parallel between favored local authority undertakings and penalized companies, which had constantly been drawn by the Socialists to illustrate alleged superior efficiency of publicly owned undertakings.

Education In Facts

It is certain none of the general public knew:—

a. That municipal electricity areas covered only a third of the country and absorbed two-thirds of the population;

b. Company areas covered two-thirds of the country but absorbed only one-third of the population.

How could they know, when nobody had bothered to tell them?

Future Progress in England

It is expected that the Bill will become an Act some time this autumn, but further months must elapse before the bureaucratic control begins to function.

The Central Authority and Area Board paid officials, totalling over 100, will have to be appointed before it will be possible to make a real start on plans affecting the future of the industry.

There is the Citrine "Organizing" Committee, but how much and what they will be able to organize before the state actually takes over is very much a matter of speculation.

Time is bound to be lost in the creation of area machinery capable of functioning independently although forming part of a national organization. It will have to be very carefully and adequately coordinated and integrated. This is no playtime job. It will call for the best brains in the industry and for independent enterprise of the highest order. This is where the breakdown is likely to occur.

Salient Lessons For America

First and foremost I would say beware of politics, beware of public ignorance of the industry, beware of timorous friends.

Don't copy Britain and discount political cranks because they happen to be few and seemingly inconsequental. They used to be few and inconsequential in Britain.

Don't take it for granted that what has happened in England could not possibly happen in America.

What has happened in England can happen in America if politicians infected with Socialist or crypto-Communist virus are not challenged at every step.

Watch events in England closely.

Use every opportunity of driving home to the American public the faults, failures and damaging effects of nationalization.

Make it an important part of your educational campaign.

Extend that education to England.

Keep England informed of the success of free enterprise.

That may help prevent the creeping paralysis of Socialism from destroying American prosperity.

* Abstract of a paper presented at 1947 annual meeting of the Edison Electric Institute.

Let Us Have Faith

LONG-RANGE forecasting is both difficult and inexact, particularly in a growing industry like ours. Instead of forecasting the industry's growth, I merely project its size on the arbitrary premise that the rate of growth in the next 30 years is one-half that of the past 30 years. Please note this premise carefully. It is arbitrary. It may be unimaginative. But the results are astounding. Look at the figures on the page opposite.

To guide this prodigious industry of the future, with its complexities and its new problems, will call for leadership of the highest order on the part of young men now rising in the industry, and other young men yet to be hired who are today being trained in the nation's colleges and universities.

High Age Level

Survey of the industry found that the average age of an electric operating utility executive who is among the top five men in his company is 57 years. One in eight of these executives is 65 years old or older; 40 percent are 60 or over; two out of three are 55 or over.

In the entire sample of more than 300 executives, there are only two who will not be retired within the next 30 years under normal retirement procedure. Only 6 percent of the top operating executives of the industry are under 45 years of age. And since 85 percent are 50 years old or over, their normal replacement may be expected within the next 15 years.

Thus, the younger men now in the industry and those to be hired in the future are presented with real opportunity.

Are we doing an adequate job of building these executives of tomorrow? Are we attracting and holding men of sufficient caliber to assume the responsibility of leading the industry 15 years from now, and 30 years from now? Are we recruiting, selecting, developing, and training our future executives, and are we stimulating them sufficiently to give them the vision and the spirit which they must have?

ELMER L. LINDSETH

Began his career in the electric service business with Cleveland Electric Illuminating Co. in 1924 as test helper. Successively became production engineer, executive engineer, assistant to the president and vice-president. Mr. Lindseth was elected president and director of the Cleveland utility in May, 1945

Are we providing the necessary incentives today to attract the necessary talent of top executive caliber to our companies?

To find out, two things were done. First, we surveyed the industry itself, to determine what incentives it offered, salary-wise; and second, we surveyed the nation's colleges and universities, to find out what young men think about a career in the industry.

The universities simply told us that salary levels of the industry's principal executives are low in comparison with the levels in many other industries, and that many able students are ignoring the industry as a result.

Two-thirds of the replies declared that the outlook for advancement and ultimate opportunity in the electric industry is considered discouraging or unfavorable by comparison with other industries.

Results of the survey of executives in the 64 electric utility companies replying to our questionnaire show that the salary of the chief executive of a company whose annual revenues are from 10 to 15 million dollars may range from $20,000 to $40,000. Among companies whose revenues are from 15 to 20 millions annually, the salary range is from $15,000 to $50,000.

A man who works for a major electric utility company and reaches a position which places him fifth in his company, salary-wise, may earn as little as $5,400 a year—or he may earn as much as $19,000 in another company of comparable size. And such companies each have responsibility for 50 or more millions of dollars of property, service to 100,000 customers, and the welfare of 1,000 or more employees.

Sufficient Compensation?

Compensation for men handling intermediate responsibilities is highly important in the industry, yet today must be sandwiched between the comparatively low level of the fifth highest paid man and the top pay received by skilled labor. Too often, this critically important sandwich is very thin.

So there is good reason to ask ourselves, "Is the industry offering sufficient compensation to attract, encourage, and develop top caliber young men who in 15 years can lead an industry over twice as big as ours is today?"

Our survey of colleges and universities found that students consider the electric utility industry's stability and security to be its major recommendation. The security of employment was cited in 54 percent of the replies as the feature which most often sold the industry to the student.

It is a fair question to ask, "Are the young men who look for security first, and for opportunity second, the right men to inherit the leadership of our industry?"

It is significant that 85 percent of

ELMER L. LINDSETH • President, Cleveland Electric Illuminating Co.*

the replies in our college survey indicated the electric utility industry had made little or no impression on young men before and during their high school days. And 63 percent of the replies indicated that the industry had made little or no impression on young men during their college years, while 40 percent indicated that no impression had been made by representatives of the industry during the important period immediately preceding graduation from college.

We need to advertise the industry, and to furnish the nation's colleges with our literature and contact them with our personnel representatives. We must compete with other industries through the establishment of formalized training courses and specific programs of development. In short, we must use all the recruiting tools at our disposal, and we must use them well.

Dissatisfied Employees

One engineering college, which operates a placement service for its alumni, reported a particularly unpleasant set of facts in regard to former graduates who had been placed in the electric utility industry. The college reported that many of these alumni, most of them between 30 and 40 years old, had become dissatisfied with the rate of their advancement, and had asked the college's placement bureau to find openings for them in different fields.

Do we remember that we now have among our employees men who, though they do not have college degrees, still have capabilities far above average? Are we developing this reservoir of manpower?

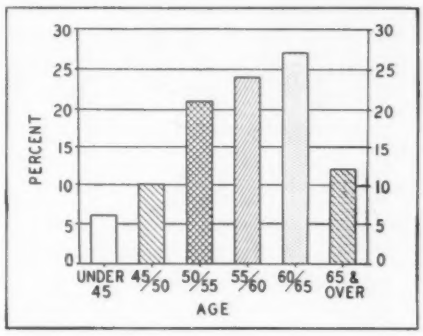
Are we convincing our young men that hard work and merit will enable them to advance financially? Do we always remember to program the advancement of every employee who proves himself outstanding?

Virtually no other industry offers more opportunity. Our possibilities

THE INDUSTRY
A LOOK AT THE FUTURE

	30 YEARS AGO	TODAY	30 YEARS HENCE
REVENUE - $BILLIONS	0.4	3.5	14
KWH SALES - BILLIONS	18	191	1,000
KW CAPACITY - MILLIONS	11	50	250
PROPERTY & PLANT - $BILL'S.	3	16	80
GROSS ADDITIONS - $BILL'S. (30 YEARS)		18	100

THESE figures show the size of the electric utility industry in 30 years if growth of energy sales continues at only half the rate of the past 30



THIS AGE distribution of top executives in the electric utility industry was determined from a survey of 64 companies representing approximately half of the industry on a gross revenue basis

are unlimited. With faith in our own industry we need have little difficulty in selling the industry to others.

These comments which I have presented are not intended to be cynical. Rather I hope they will prove constructive, because I do have great faith in our industry's ability to build an even more brilliant future for itself.

But to build that future, we'll have to do some things to improve ourselves. Let's call them a "do" list for immediate action.

First, when we get back home, let's take a good look at our companies, and their future. Let us project 15 years into the future, and 30 years, to see how each of our companies stacks up in potential size and complexity. We'll soon realize it will take an increasing amount of top manpower—more and better manpower than we think—to run this giant industry of ours.

Second, let's examine the incentives of our companies, to stimulate maximum growth and development of our present people, and to attract more and better new ones. And let's review the job of providing adequate compensation and recognition as a reward for merit and talent.

Third, let's take a look at our development and training programs, to make sure that we really do provide a good future to outstanding young men, and then let's beat the bushes at the nation's colleges and universities to attract more young men of this caliber. And let's do a full-dress job of making a favorable impression on youth and on our communities. This is a job not only for single companies, but for the industry as a whole. Let's re-sell high schools, colleges, and engineering schools on the future of our industry.

Immediately and Together

Fourth, let's realize that we must act immediately, and that we must act together. The nation's colleges are filled with the best potential material in their history—the former G.I.'s. These men are eager to start civilian careers in which initiative and ability will give them higher-than-average rewards. Thus, this is the best possible time to organize for joint action in telling them about the future of our industry, to develop recruiting programs which will bring them to us, and to organize training and development programs which enable them to make the most of the chance they are waiting for.

As a vital basic industry in the most powerful nation that history has ever known, it is our obligation to aim high, think big, and have faith. For our future is for the most part what we make it.

Let's remind ourselves, "Where there is no vision, the people perish." And let's remind ourselves, too, that if only we have sufficient faith, our future can be unlimited.

* Abstract of address to 1947 convention of Edison Electric Institute.

Marketing . . . The Next Big Job

DON G. MITCHELL • President, Sylvania Electric Products Inc.*

OUR BIGGEST CHALLENGE is marketing. To bring to market profitably the vastly greater production of the years ahead is not a problem that can be solved by the old rules. We need new visions, new imaginations, new daring, new methods—and—if those now in the sales jobs do not measure up to the larger task, we shall need new men.

No matter what your immediate situation may be, now is the time to encourage your commercial departments to get going, particularly in those markets where for the past five years you have had little or nothing to sell. It takes time to build up sales momentum. Already it may be later than you think.

As manufacturers we are concerned less with what you sell today than with your commercial plans for the decade of the fifties. During that period, we must keep our people employed and our factories busy. How much can we depend on you to provide a market? What are your plans? Will they be based on your previous growth figures or something much more stimulating? Frankly, your pre-war record of load building is not going to be sufficient to take care of the ability of the electrical manufacturers to produce. If we are to do our part in strengthening the economy of this country, we shall need plans for expanding the use of electricity far beyond anything so far.

Spade Work by Utilities

Please don't misunderstand me. We are not asking you to do our selling for us. We'll sell and we'll sell as we never sold before. At the same time, we know and I am sure that you do also, that we can produce our best results in areas where the market has been prepared. That is your responsibility. You prepare the soil and I can assure you that the manufacturers will help you in every way to bring home a bumper crop—but don't skimp on the fertilizer.

DON G. MITCHELL

Instead of Sylvania's president, Don Mitchell might be today an eminent athletic coach. He was waiting for the school year to open as his start in that direction when he was offered a job with McGraw-Hill Publishing Co. That was the beginning of a business career that included Niagara-Hudson Power, American Can, Marshall Field and Pepsi-Cola as steps to sales head of Sylvania in 1942. Four years later he was made president of the corporation

You can't let down. The moment you do the door is opened for transfer of ownership to government. There can no longer be any room in this country for self-satisfaction on the part of any industry and particularly the utilities.

For that reason, those of us who wish to preserve free enterprise must work together with a strong sense of interdependence. You are not alone. Most electrical manufacturers grew up and prospered with the light and power companies. We want to continue to work with you. We will do everything in our power to help you to expand the use of electric service provided only that you have the vision and the courage to make bold plans for growth and development.

The measure of attractiveness of your area as a market will be the size of the objectives you set and the degree to which you will provide the means to reach those goals. The higher you set those goals and provide the necessary money and manpower, the quicker will you have success, because the rest of us will imbibe of your enthusiasm and demand bigger and better goals to conquer. On the other hand, if you set them low and comfortable-like, don't be surprised if you have to do most of the work alone, because the manufacturers will give the greatest assistance to the most attractive areas.

Good Men Strongly Backed

Sales managers who are satisfied with the pace of the past and make no extra effort have no place in the program I am talking about. Because of the apparent lack of incentive, there has been too much inertia in too many utility sales departments. Men who cannot supply their own incentives have no place on tomorrow's team. It will be the responsibility of top management to replace them with men whose reach is farther than their grasp.

At the same time, don't criticize the sales manager unless you are willing to give him the tools that are needed to do the job properly. He can have no vision, set no goals and make no plans that are bigger than the money and manpower allowed him.

A liberal budget will permit you to hire more and better sales people. With more money, you can discard the policy of how-little-can-salesmen-be-had-for in favor of how-much-compensation-is-possible. Out in competitive business where every penny counts, it has been proven over and over again that salesmen who are well paid are far less expensive in the long run than those who are willing to work for a small income.

One of the more effective tools in

* Abstract of paper to 1947 convention of Edison Electric Institute.

tomorrow's marketing is bound to be cooperative effort. If everybody is working in the same direction with same objectives, it is natural to expect much more to be accomplished. That is why we look for such great things from the Planned Lighting Program. Instead of the several lamp manufacturers competing for your attention, each with a different program, how much more reasonable is it for you to work out a single program of your own which all of us can accept and work for.

Like any other cooperative endeavor, the individual underwriters must submerge to some degree their individuality and this is done in the belief that the end result will be greater than it would be through each going his own way. It is our joint responsibility to see that it works out this way.

In closing, let me emphasize once more that we are placing the economic welfare of our employees, our companies, our industry and our country in the hands of those entrusted with marketing. They must be right and their tools must be adequate. In every way they must be encouraged to achieve goals way beyond anything in the past. Be generous with money, manpower and facilities. There can be no leisurely approach to this task.

What Makes Leadership?

FRANK R. PIERCE • President, Dearborn Motors Corp.*

THE QUALITY of leadership in the individual is the same as the quality of leadership in a country. That quality is freedom!

Leadership takes the nerve, the guts if you please, to do something on your own because you know it is right and because you are willing to take the consequences.

From an economic standpoint, leadership is the opposite of security. It pays good dividends if you win, but you will never become a leader if you look for security in everything you do. I challenge the industrialist who tries to attract leaders by offering security.

If I wanted to criticise the utility companies of America, which I don't want to do, I would question the system which has caused many utility people to say to me from time to time, "I can always work here if I don't stick my neck out and am willing to go along." In other words, security, but, I ask you, "Does that create 'leadership'?"

If you would be a leader, "Have the courage to do what you know is right and be willing to take the consequences." If your boss won't delegate responsibility to you, take it. He'll either love it or fire you. If he loves it, you are on your way to becoming a leader. If he fires you, you don't have a chance with him anyway.

FRANK R. PIERCE

Before becoming president of the Dearborn Motors Corp. in 1946, Mr. Pierce was associated with General Motors which he first joined as sales manager of the Frigidaire Division. In 1939 he left General Motors to go with Nash-Kelvinator but returned in 1943. The next year he became vice president, the position he held until 1946 when he became president of Dearborn Motors Corp.

The people who work with you must believe in you, respect you and understand you. You represent management to them. You are management. What you say and what you do is watched constantly by everyone in your group. It is your responsibility to interpret the real thinking of management in the light of today's conditions—not what it was ten years ago.

Favoritism tends to lower their respect for you. So if you want to be a leader, you can't play favorites.

A slight pat on the back, a real friendly smile will go a long way towards creating a friendly attitude in your group.

People don't mind fair criticism. Neither do you. But hasty criticism, before you are sure of all the facts, breeds trouble for the leader.

People like to know that their leader is fighting for them. Have the courage to fight for your people. Take up for them.

The price of leadership is not great. It calls for faith, it calls for work, and it calls for courage. No one has ever found a real substitute for believing in yourself and working hard to get what you want.

I would like to add just one more quality to that of a leader—more important, in my opinion, than many of the others. Be enthusiastic about what you are doing.

If you would be a leader among men, cultivate enthusiasm. People will like you better for it; you will escape the dull routine of a mechanical existence and make headway wherever you are.

* Abstract of paper to 1947 meeting of the Edison Electric Institute.

Rates . . . A Challenge

G. M. GADSBY • President, Utah Power & Light Co.*

IN CONSIDERING the possibility of maintaining present rate levels or making further reductions in the face of increases in costs in every component of our plant and operating accounts, it behooves us to start anew in getting and recording the facts, then facing them for action. It may well be that we are approaching the end of the road along which we have been traveling of offsetting increasing costs with greater efficiency, improved load factors, decreasing money rates.

An additional factor is becoming of increasing importance, the reciprocal of diversity factor or what rate experts call coincidence factor. This means the effect of the individual users' peak demand upon the ultimate system load peak. To arrive at satisfactory conclusions as to the coincidence factor much more information is necessary, first by determining the place of the individual user in his group, then the relationship among different customer classifications and finally the resultant effect upon system peak load.

Elasticity of Demand

Present rate structures as applicable to loads having today's load and coincidence factors must be maintained if new business is to make its fair contribution in sustaining the present rate of return. Increases in costs or a change in load characteristics which will increase the factor of coincidence may necessitate a restudy of present rate schedules so as to shift the steps within the rate schedule to meet the altered cost component relationships.

Such studies as have been made indicate there also is a profitable field awaiting improved use of present demand or an increase in load factor exceeding the increase in coincidence factor, and this brings into the discussion the elasticity of demand. The first few kilowatt-hours used by any customer is inelastic in that such use is independent of prices as they now obtain. This block roughly corresponds to the number of kilowatt-hours in the first step of residential and commercial schedules. The next block in terms of elasticity includes use in which price is somewhat of a factor but after use is once established, convenience rather than the monthly bill controls. Then there is a range of potential business in which elasticity of demand is controlling.

Another challenge offered by economic conditions of today and the immediate future is that of improving the operating statement by decreasing costs. It has become almost involuntary to think of costs in terms of effect on gross income after taxes rather than in full round dollars. Suppose we now think of how many operating revenue dollars will be required to net after taxes the amount required for the expenditure under consideration. We are in an economy of scarcity and high prices. If we get along with what we have to the greatest possible extent, replacements at a later date will be at lower cost and will support the general economy.

GEORGE M. GADSBY

Began his utility career in 1909 as chemist and superintendent of the Warren (Pa.) Water Co. Subsequently he was associated with the American Water Works and Guaranty Co. and later served as superintendent of the Arkansas Water Co., Little Rock. In 1917 he became assistant to the president and later vice-president of the West Penn Power Co. He was named president of the company in 1927. Since 1929 he has been president of the Utah Power & Light Co., the Western Colorado Power Co., and the Utah Light & Traction Co.

Rate Simplification Needed

Still another challenge is the possibility of further simplifying rates and operating procedures to improve public relations. The education of the public in the value of electrical service has proven of more value than the earlier efforts to teach the consumer how to read his meter. True, the kilowatt-hour is an intangible thing but it is just as true that nothing we can do will give it physical form and substance. Let's accept that.

When the industry itself has determined the area in which it can profitably sell additional kilowatt-hours at a lower rate, controlling or new metering devices may be required. To dream up just one suggestion, let us conceive that in the home of the future there will be a small control box which will show a red light when the total load reaches a predetermined maximum. This will indicate that the bill will be higher because of what we know as block extenders in the schedule or because the demand component will go beyond the previous maximum. The same box will have pushbutton controls so that certain things can be cut off. No lessening of service will result if the water heater circuit is interrupted while the range is utilizing four elements. The consumer will then know that the control of the monthly cost of his service is his to command, even though that service will still be measured in kilowatts and kilowatt-hours.

* Abstract of a paper presented at 1947 annual meeting of the Edison Electric Institute.

Looking to Your Future

L. E. OSBORNE • Vice-President, Westinghouse Electric Corp.*

THE ELECTRIC power industry now is in a period of the greatest expansion in its history. Utility construction budgets will approach a billion and a half dollars—almost 50 percent more than in any previous year in your history. Almost three million kilowatts of new generating capacity are scheduled for this year.

Last year the output of electric power amounted to 223 billion kilowatt-hours. With continuation of favorable business conditions, this may reach as high as 300 billion in the next five years.

From this, some may conclude that electric power is a business with nothing wrong—no problems, all clear sailing. I'm sure this isn't so. You have problems that concern you, just as we have ours. More than likely, your problems and ours are the same.

One common problem stands out. It is the need for talent—the need for the best men—in management, in engineering, sales, employee relations, public relations, and other key spots.

Not Interested in Power

Where are we to get the best men to fill key positions, to fill your place and my place and the places of others in the ranks of management, and to bring us new knowledge, new skills, new techniques?

For the most part these men today are the students in American colleges and universities; most of them are in engineering schools.

We have found recently that there has been a serious falling off of interest on the part of these young engineers in power equipment. There is no difficulty in interesting them in electronics, in nuclear physics, in communications, and in other more "glamorous" fields—but there is less interest in the field of electric power.

With constantly expanding horizons, your industry—and ours—must have an adequate share of the young technical men of the country to carry on enlarged activities of the industry.

L. E. OSBORNE

Joined Westinghouse Corp. in 1910 as a clerk in the tool room. Advancing through various positions he became senior operating vice-president of Westinghouse Electric Corp. in 1946. Mr. Osborne served successively as superintendent of metal stamping department, East Pittsburgh works; assistant works manager and subsequently works manager, meter division, Newark; works manager, East Springfield, Mass. In 1939 he was named manager of manufacturing and engineering of the company's appliance division. He was named vice-president in charge of the South Philadelphia operations in 1942 after service as Chief of Heavy Ordnance of the Office of Production Management. He advanced to his present position in 1946

Westinghouse has become interested in the establishment of several regionally sponsored power system calculating boards which will solve some of your technical problems and allow engineering students to carry on advanced study of power systems. These calculating boards will bring engineering students into close contact with some of your systems, revealing to them that there are still many intriguing problems in your industry.

We've also made available suitable equipment to encourage the establishment of up-to-date power plant laboratories in a number of schools.

Through a summer program for professors, we are helping engineering teachers keep abreast of developments in the electric power field.

Utility Training Course

My company is also planning to open a special training course for young utility engineers. The course will last about eight months and will be designed to give the young engineer who is entering the electric power industry basic training in manufacturing, engineering, and application of electric power equipment. Most of the course will be similar to the training we give our own graduate students, but the last part of the course will be devoted to an intensive program on central station engineering.

Electrical manufacturers, of course, can only aid in the solution of the problems of keeping a steady flow of new and better talent into the electric power field. Any general program to tackle it must be developed by the electric utilities. One suggestion I might make is to have a prospectus of the light and power industry prepared and presented to every interested student. This, at least, would help the young engineer to evaluate the industry and compare it with these industries now attracting engineering students by glamorous publicity.

This we must remember—that the true value of a great industry or business is not represented by bank statements, superb machinery, the efficiency of its plants, or the brick and mortar which make up the buildings. The greatest asset in any business is its people—and more particularly, the men who occupy the key positions and keep the business alive and progressive.

* Abstract of paper to 1947 convention of Edison Electric Institute.

Public Attitude Today . . .

DR. CLAUDE ROBINSON • President, Opinion Research Corp.*

ALL OVER the world today men are grappling with the problem of how far the state should go in organizing economic and social life.

In Russia, the trend towards statism has gone to the extreme, with state ownership of virtually all property, collectivization of farms and government control of labor unions. In England under the Labor government, nationalization has made great headway with the Bank of England, the coal industry and transport going under government control, and with industries like steel and other heavy industries next on the list.

The English think that they can have nationalization and liberty too. But when there is national planning, individuals will have to be coerced to abide by the plan. Hence liberty with nationalization is a false hope.

Majority Favor Free Enterprise

In the United States the majority opinion still favors the institutions of private property, free markets, competition, the profit incentive, and individual freedom, but in this country there are clear indications that the world statist philosophy is attempting to gain a foothold here.

Public opinion polls show that a larger percentage of people are for government ownership of the electric power industry, hence it is accurate to say that one of the primary spearheads of statist thinking is to put the government into ownership and control of electric power.

Some people argue that the trend toward the government ownership of the means of production is inexorable and that we might as well fall in line. This is the sheerest nonsense. The trend is toward freedom.

The social mechanics of freedom depend on a system of checks and balances where wealth and social power are distributed widely enough so that private groups can support movements without calling on the state. If this contention is true, then statism means reaction, not progress.

CLAUDE E. ROBINSON

Dr. Robinson's Ph.D. thesis at Columbia University, "Straw Votes, a Study of Political Prediction," was one of the pioneering works in the scientific study of public opinion. Prior to founding Opinion Research Corporation, in 1938, he was associate director of the Gallup Poll. Opinion Research Corp., which he heads as president, carries on research activities in a wide number of fields including public relations, dealer relations, labor relations, political studies, studies of editorial problems, style design and pricing of products

Since the nationalization of electric power has more popular support than any other nationalization movement, it becomes urgently necessary for electric power managements to visualize the handling of public opinion as one of their primary jobs. To operate an electric power company successfully today, management must be close and careful students of popular trends and of the means for communicating ideas to the general public.

The electric industry has made a beginning on its job of reaching the public mind, but the indications are pretty clear that electric company managements have not done all they can do to influence public opinion. The industry has an advertising program that is in good and competent hands. The question is, has industry backed up this program adequately with effort at the local level? Individual companies are engaged in many movements locally that add up to winning friends and influencing people in favor of allowing private management to continue to shoulder the responsibilities of generating power. But not all has been done that can be done to merchandise electric power leadership. When an economic product is being merchandised, the first thing a company does is to set down the claims for the product and theme these claims in terms of the public's interest.

Must Sell the Package

In any merchandising campaign, once the package is worked out, the salesmen of the company are called in and given the word so that they can pass it on to the public. How many electric companies follow this procedure in spreading the gospel of private ownership?

How many companies stimulate their people to go into the community and preach the gospel of private power? In our last annual survey it was shown that only 2 or 3 percent of the people can remember talking with the employees of the electric power companies on the question of private versus public power.

Public opinion studies show that people know companies in good part by personal contacts with employees of a company. Surely the electric power industry cannot be satisfied with reaching only 2 or 3 percent of the public a year through its employees. Every company in the country has a problem of educating its employees and townspeople on the simple facts that make our system of competitive capitalism work.

*Abstract of a paper presented at 1947 annual meeting of the Edison Electric Institute.

. . . What To Do About It

E. R. DUNNING • Vice-President, N. W. Ayer & Son, Incorporated*

THE Electric Light & Power industry has many advantages over most businesses.

We deal in an essential to American life.

It's a cash business—we get paid nearly every day.

There is general desire for our product without the necessity for heavy brand promotion.

We have competition in many ways but not the kind of competition that other industries have.

Unlike most industries, our companies control the manufacturing, the production *and* retailing of electricity—and that's a big difference. Because we are manufacturer, distributor and retailer, we sometimes get mixed up as to which end of our business is most important.

That's not strange. Engineers, technicians, and scientists started the industry. Their job was to make electricity. Then the financiers came in to help and distribution claimed a great share of their attention. Then the opportunity to *sell* more than ever before became increasingly important. It called for different types of thinking and action than the industry had shown in the past and it is still calling—for retailing involves new problems. There we deal with John Q. Public—and he is, as I said before, no abstraction.

Undermining Old Philosophies

Sure, I generalize here, but I wanted to cover history a bit because what Walter Lippman calls the "acids of modernity" are eating into our former complacent busyness—they are undermining the old philosophies—the old patterns of our work family—as they are changing the social consciousness of our home families.

Six years ago, 52 companies, sensing some of the new patterns that the "acids of modernity" were etching, started the Electric Companies Advertising Program. It was intended to provide, and has done so I believe, a national backdrop of importance and authority against which the companies' local activities would be more favorably highlighted and provide a strong wall of opinion to offset unwarranted criticism and maljudgments.

EDWARD R. DUNNING

Background for Mr. Dunning's career in advertising had its beginnings as an office boy with F. W. Dodge Corp., where in 13 years he rose to news editor of the firm's construction reports. From Dodge he went to Crowell Publishing Co., first as an advertising salesman in Chicago, then as Eastern advertising manager for *Woman's Home Companion*. In 1926 he joined N. W. Ayer as a representative, serving such accounts as Squibb, Cannon Mills, Rolls Royce. In 1934 he became a vice-president of the agency. For the past six years he has directed the Electric Companies Advertising Program

E.C.A.P. is not alone in the effort to persuade the people that the preservation of the electric industry is the way to help produce the more abundant life that the people crave. Other avenues to that end are being offered with tempting bait. Change has many allures. We may be cut-traded too, for we use *understatements*, with responsibility behind them, and we work with an industry that I love but one that doesn't always look at fundamentals, even, through similar glasses.

We can win, though. We can protect American enterprise and our way of life—not by railing at objectionable foreign philosophies but by showing how much more practical and beneficial our way is. But you have to help—it's your home—your job at stake and you can't expect your neighbor or your neighboring company to do it for you.

Adapt and carry out a continuous informative effort using all media available.

Make sure that your employees understand the battle.

Encourage the "up and comers" especially to take part. Show by example through them that the "opportunity" part of our story is true and workable.

Can Win All Together

While this is your battle—you can't fight it alone. Join up with every worthwhile community enterprise—that's enlightened selfishness. Join up too with your industry's preservation efforts—that means E.C.A.P.

And put your faith in an axiom—that if the Americans are told the truth, their judgment and their subsequent action will be fair and square.

If the election of 1946 shows us anything in the six months that have passed, it should teach us that industry—ours or all of it—does not belong in partisan politics. It belongs to the people. Their success, their hopes, their welfare are tied up in the success of industry. I think the younger minds may see this more clearly than older heads, for it is a way of thinking that is still young—far, far removed from the outmoded "public be damned" attitude. Maybe its the "acids of modernity" working.

*Abstract of a paper presented at 1947 annual meeting of the Edison Electric Institute.

Let's Tell America

ROBERT S. PEARE • Vice-President, General Electric Co.*

IF the scientific measurement of public opinion has taught us anything, it is how little we know our strength, how vastly we underestimate our weakness. Words and the men who use them are more important today than ever before in human history. We have the high responsibility to use them to evoke understanding and belief.

Such words as "the American way of life" and "free enterprise" once sounded brave and meaningful, but through too much handling have lost their very texture and substance.

We Know by Experience

You and I have known what the American way of life is, because we have been making and selling it in the electrical industry for a long time. You and I, in this business, know well what free enterprise is, some of us by proxy and inheritance and some by actual experience. We have in our own lifetimes touched the devices, rubbed shoulders with the pioneers, and been paid the very real dividends of one of the greatest industrial adventures of all time. We have not learned about private enterprise from books, from teachers, from advertisements, from public speakers. We know it from our own experience, and we have no difficulty in identifying that experience as genuine. Because of this circumstance we are fortunate; and because of this circumstance we have an obligation, to somehow, in some way, transmit our experience and our conviction to the millions who are skeptical, bitter, indifferent, ignorant, careless—and dangerous. The innocent today are the most dangerous of all.

Now, what are we going to tell America, and how are we going to tell it?

1. Are we going to tell America that American industry is the greatest material force in the world—and then find ourselves faced with charges of too much power and renewed demands for more control and regulation?

ROBERT S. PEARE

Entering General Electric through its Business Training Course in 1922, Mr. Peare was elected secretary-treasurer of the Maqua Co., G.E.'s printing and engraving organization, in 1926. Became general manager in 1929 and president in 1934. In 1940 he returned to G.E. as manager of the publicity department and was elected vice-president of the company's advertising, broadcasting and general publicity activities in 1944

2. Are we going to say that American industry has provided the highest standard of living the world has ever known and spread it over 140,000,000 people—only to discover that they don't believe us because they have no effective and realistic basis of comparison?

3. Are we going to tell America that the drive to destroy the profits of American industry is for the purpose of insuring that our industrial machine can never be rebuilt to the point where it can adequately serve the American people in war or peace—and point out that this is happening at a time when Russian economists are predicting the downfall of our economy because there isn't enough profit in it?

4. Are we going to tell them, and prove it, that American industry is too smart to destroy its market, its communities, its country, by intentionally weakening the buying power of its workmen and customers?

5. Are we going to show them that the difference between investment of tax moneys and investments by private capital is that in tax money the control passes, except indirectly, out of the hands of the person who has provided the money—and that this control is the goal of the tax spenders?

6. Are we going to tell America that American industry has a promise and a plan for every one of them, and show them what it is—or are we going to leave them to listen to the siren song of other plans and planners?

There are kids in your operating neighborhoods who will come to maturity without the slightest conception of the proved desirability, the proved achievement, or the proved indispensability of what we have been calling private enterprise. What they think about business and profits would make your hair stand on end. What have we done about it? Not very much.

Show Those Kids

A light and power company just happens to be one of the most interesting enterprises in any community. Its wonderful equipment, its role of universal servant to homes and businesses all over town make it Exhibit A in any progressive school room. If the kids in your community don't know how electricity is produced, distributed, and controlled; what kind of jobs it is called upon to do locally; how its selling price is arrived at and why that is a fair price, then you have a job cut out for you that is just as important as anything you may be doing.

*Abstract of a paper presented at 1947 annual meeting of the Edison Electric Institute.

Keep Enterprise Ticking

VIRGIL JORDAN • President, National Industrial Conference Board*

AMERICAN ECONOMY today is practically at the highest peak of production on record in relation to the amount of labor time and effort, capital, tools and other resources being put into it. Nevertheless, the current picture of the position of the American economy is in many important respects seriously misleading and even largely illusory. The dangers that face it are still real and perhaps greater than they have been in the past. It has drifted much closer to the condition of the collectivist economies in the rest of the world than most of us imagine.

When you consider the nature and cause of these changes it seems clear that they have been part, and perhaps a consequence, of a world-wide drift toward various kinds of compulsory collectivism that has been going on for a long period.

Unconscious Business Men

During the past decade this drift away from economic freedom, and the growing indifference toward it, have seemed to proceed under a sort of emotional or intellectual anesthesia to which almost all groups among the American people, notably including business men, have been subject.

It seems clear to me that you cannot keep the kind of economy we have had in America ticking very loud or long, or ultimately at all, if the people who compose or operate it don't care about freedom, are losing their sensitivity to its restriction, or set a dwindling valuation upon it by comparison with other things like security, stability, income and the like.

The costs of goods and services are being increasingly collectivized and shifted from the immediate consumer and user to some more remote group, such as the general taxpayer, and the responsibility and risk to provide them removed from the individual or enterprise to some public official, agency or authority.

VIRGIL JORDAN

Following several years of postgraduate study in economics at the University of Wisconsin, Columbia and foreign universities, Mr. Jordan joined the faculty of the economics department at University of Wisconsin. He was associate editor and special economic writer with "Everybody's Magazine" until 1920 when he left to become chief economist and editor of the National Industrial Conference Board publication. In 1929 he became economist for McGraw-Hill publications, returning in 1932 to the National Industrial Conference Board as president

The essence of this doctrine is that under modern conditions it is necessary for governments individually and collectively to conduct a continuous compulsory redistribution of income, wealth and surplus production to consumers at home and abroad by manipulation of the community's savings, investment and consumption through appropriate fiscal policies of taxation, public spending and borrowing, and government management of the financial system and the capital market.

Whatever the explanation of the spread and acceptance of these ideas, the plain fact is that their application is making the preservation of a free enterprise economy in America more and more impossible and is promoting and speeding its ultimate collapse.

But the American enterprise economy is not merely a free voluntary competitive economy. It is also private capitalistic enterprise economy, and every part of that description is indispensable.

Bricks Without Straw

It might seem to be obvious that you cannot have any kind of capitalism without capital, but that is essentially what we are attempting today. A fundamental part of them is the belief that the main reason why the American enterprise economy doesn't work any more is that it tends to accumulate too much capital, that over-saving and under-consumption are the chronic disease of private competitive capitalism, and the only cure for it is fiscal policies and financial controls which redistribute the income, promote consumption and enable the government to manage the community savings and investment.

The essential consequence of this system is to provide a vast pool of funds for public spending and investment into which the individual private savings of the community are conscripted and siphoned off continuously for government use. Under this mechanism, investment in government securities has become compulsory and automatic for most of the population. It unquestionably affects the flow of private savings and capital into private investment and imposes a formidable handicap upon the survival and expansion of a private capitalist economy.

The color of the carrot that kept the enterprise donkey going in the American economy has faded considerably in the past decade, and for more and more people the reward has seemed less and less worth the sacrifice or the effort to reach it.

* Abstract of a paper presented at 1947 annual meeting of the Edison Electric Institute.

An Engineering News Report

J. W. PARKER • President, The Detroit Edison Co.*

OPPORTUNITIES for economical improvement in steam power plant techniques lie in the better management of the combustion of the fuel and, in the case of solid fuels, in the better disposal of the solid refuse of coal; better proportioning and disposition of the heat exchanger surfaces of the boiler, economizers and preheater directed to much the same purpose; and the choice of a more efficient heat power cycle through employment of a higher initial temperature and pressure or by elaboration of the heat cycle. The same opposing influences which have always operated, continue to determine the fundamental design of plant under the circumstances obtaining in each case—the tendency to elaborate for the sake of higher thermal efficiency and the counter-vailing commonsense purpose to simplify in the interests of first cost and reliability.

Combustion Problem

One problem is that of designing a combustion system such that the boiler can be run as continuously as the turbine and without excessive dirt or ash being given off by the stacks. Such continuons performance makes more practicable the installation of one or two boilers directly connected to a single turbine, which in turn keeps the cost down by eliminating spare boilers and by minimizing the amount of costly cross-connection piping.

Gas Turbines

For large central station work the gas turbine does not appear to have a competitive place. Its size is limited, at least for the present, to some 10,000 kw., which makes it generally unattractive for large central station use. It will have a place in situations where smaller sizes are sufficient and where the condensing water supply is inadequate.

* Abstract of a paper presented at 1947 annual meeting of the Edison Electric Institute.

JAMES W. PARKER

For 20 years chief engineer of the Detroit Edison Co., which he joined in 1910, Mr. Parker was elected vice-president of the Motor City utility in 1935. He became vice-president and general manager in 1943 and was elected president a year later. A vice-president and trustee of the Edison Electric Institute, Mr. Parker is also president of the Association of Edison Illuminating Companies and past president of the A.S.M.E. and the Engineering Society of Detroit

In the field of fuels there is also a development of some promise; namely, that of the underground gasification of coal. Initial experiments are only now being carried on in this country by the Alabama Power Co. in cooperation with the Federal Bureau of Mines.

Cable

There is a marked increase in the use of underground cable at 100 kv. and above. The trend is now toward placing extra high-voltage circuits in steel pipe.

In the field of high and medium voltage self-contained cables the problem continues to be one of sheath integrity. Newer lead alloys show promise and sheaths of thin lead with plastic overlays are being offered to give corrosion protection and at the same time retain, with a minimum of lead, the advantages of a conducting sheath.

Switchgear

In indoor switchgear the trend is very definitely toward oil-less equipment in all voltage classes to such an extent that the principal manufacturers anticipate a marked reduction in the demand for oil breakers. The reduction of fire hazard is the principal reason for making this particular change.

In outdoor switchgear the development and use of oil-less and oil-poor switchgear, in this country, has been not too popular and there is some feeling that we would do well to go slowly in abandoning the advantages of oil breakers, particularly at the very high voltages.

Need for higher interrupting capacities in the medium and high voltage fields is definitely appearing.

Distribution Practice

The expansion of distribution systems to care for heavy load increases takes two forms, one an increase in primary voltage, the other the extension of transmission lines nearer to the load centers and the closer spacing of substations.

The heat pump has attracted considerable attention of late. In considering the feasibility of the heat pump, the following should be borne in mind.

1. Unless the cost of heat pump installations can be greatly reduced, there appears little chance that they will work out economically in cold climates.

2. Except where the price for electricity is very low, the operating cost would exceed that of ordinary types of fuels.

3. There is little daily load diversity between heat pump installations and, if at all generally used, they might determine the system peak.

Atomic Energy

REAR ADMIRAL WILLIAM S. PARSONS, USN • Navy Director of Atomic Defense*

TWO generations of the Twentieth Century had produced a numerically small but brilliant group of nuclear scientists and had also produced knowledge of location and processing of ores rich in radium and its parent, uranium. From 1940 to 1945 we cashed in on two generations of accumulated capital in the form of scientific talent and techniques; and geological and chemical "know where" and "know how." Since 1945 we have arrived at a point where major progress depends on long-haul work.

Three Tasks

The first long-haul solution is to train the large number of students who have talent in the field of nuclear physics and chemistry. To do this we need in the universities most of the inspired nuclear scientists who made the 1942-1945 mass attack on the atomic energy problem. Until this new crop of students is trained and seasoned it will be unwise to launch huge applied research and development programs which could only be carried out at the expense of teaching. For this reason I call the next five years "lean" as measured in the economy of human talent.

The second long-haul problem has to do with geology and the processing of ore. We need to start where the radium-seekers ended in 1940 and make a geological search of the world for ores that are rich in uranium and thorium. At the same time it is necessary to work on the development of methods of processing low grade ore. It is difficult to predict how long the "lean" years in the uranium-thorium economy will last, but one might guess five to fifteen.

Coordinated Support

The third economy which operates in the atomic energy field is the dollar economy. It is almost inconceivable that further development in this field would be hampered by lack of financial support. The principal hazard could come from uncoordinated autonomous projects which might compete for the available human and fissionable material. This danger should be avoided by the provisions of the Atomic Energy Act which assigns to the Commission a monopoly in the field.

WILLIAM S. PARSONS

Commissioned an ensign in the U. S. Navy in 1922 following graduation from the U. S. Naval Academy, Admiral Parsons rose through the grades to commodore in 1945. During the early defense period before World War II he was assigned to experimental ordnance development at the Navy Proving Ground in Dahlgren, Va. From 1942-43 he was special assistant to the director of the Office of Scientific Research and Development, working on the radio proximity fuse. Subsequently he was associate director of the atomic bomb project at Los Alamos, N. M., and flew with the first atomic bomb mission to Hiroshima

Development of atomic power means first that high-temperature chain reacting piles must be designed, built and then exhaustively tested. All of the atomic energy piles built during the war were of the low-temperature type. So far, high-temperature piles exist only on the drawing board. Several of these experimental power piles may be ready for operation before the 1950's.

If we are predicting a time scale for atomic power development we might expect the engineering to take some five years after the first experimental piles begin high-temperature operation.

Nuclear Boilers

Nuclear-powered boilers to heat communities and generate electrical power for industry may be economically justified in areas which have little coal or hydraulic power. The distribution problem in the case of power generated by nuclear reactors will be essentially the same as that of present systems. Some of our best-informed experts have estimated that at least a generation will pass before there is anything like general use of nuclear power in industry.

Serious problems and difficulties must be overcome before atomic energy can be generally used as a source of power. Many years will pass before all of these long-haul problems are solved and results are put into practice.

Evidence in the field of nuclear fission is extensive and it all points toward the conclusion that the atom and its nucleus are law abiding. The stability of a nuclear chain reaction is very great in comparison with a chemical chain reaction. For example, the nuclear chain reaction in an atomic bomb ceases to multiply at an instant when the temperature is in the millions of degrees and the pressure is many millions of atmospheres. The reason is simply that expansion has reached the point at which more neutrons escape than are replaced by each new generation. So the nuclear fire goes out with most of the active material still unburned.

* Abstract of a paper presented at 1947 annual meeting of the Edison Electric Institute.

Construction Cost Trends

WILLIAM F. RYAN * Assistant Engineering Mgr., Stone & Webster Engineering Corp.*

CONSTRUCTION COSTS are so high that we find it difficult to believe the figures. We all know that equipment prices have advanced 30 to 50 percent since VJ-Day, but we are still staggered by the cost of a new installation.

There are many factors in the present high cost level, but the price of electric power is not one of them. It is one component that has not contributed to the rising commodity markets. Throughout our cycles of booms and depressions, the end of each full swing has found electric power delivered to the consumer at lower cost than it was at the beginning, even though every major element entering into its production has gone up in cost during the same period.

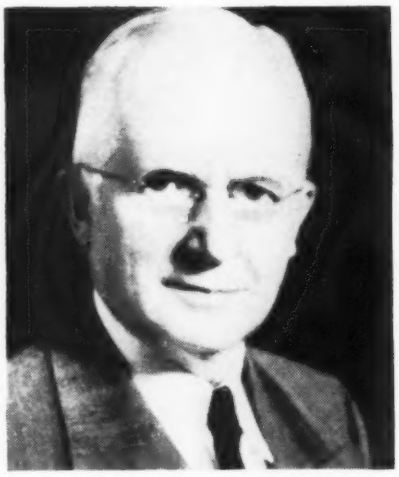
Components of Power Cost

Some of the major items comprising the public utility's "Cost of Living" are shown in Fig. 1. Trend of these components of production expense in the years since the end of World War I has been mostly upward except for utility bond interest rates which are now at a relatively low level. But the industry has continued to deliver its product at lower and lower costs.

Basic reasons why the electric industry has been able to pay more and more for all it buys, yet sells its product for less and less are shown in Fig. 2.

Note that increase in productivity here shown has made it possible to lower rates almost continuously, but how much longer can technological progress stem this tide of rising costs? It cannot go down forever! Perhaps we have already touched bottom. Perhaps the long term trend has been reversed and the day is approaching when public utilities must demand an increase in rates.

Rates may be adjusted upward or downward to follow the price of fuel without excessive complaint from the consumer, but what we invest in electric plant at the peak of the market is frozen at that level for its useful life. Rates can not be lowered because construction costs have come down, without sacrificing reasonable return on investment.



WILLIAM F. RYAN

Since joining Stone and Webster Engineering Corp. in 1929, Mr. Ryan, as mechanical engineer, assistant chief mechanical engineer and assistant engineering manager, has been responsible for the design of numerous chemical and industrial plants as well as utility power stations totaling about 2,000,000 kw. of capacity. During this period he has also acted as consultant to utilities in matters affecting system development, tax valuations and rates

Like production expense, the cost of plant has many elements, and price trends of all these elements have been carefully recorded over the years, and combined to form an index for total cost of plant.

Fig. 3 shows such an index repeated from Fig. 1. It is a graphic representation of the relative cost of electric plant in a particular region of the United States from 1910 to the present for a system on which all power is generated. For purposes of comparison, we have shown on this chart the indices of some commodities which affect the cost of electric plant.

In the development of this index, 14 electric light and power company properties located in 12 states were analyzed to obtain a composite weighting of the various amounts making up the properties. Accordingly, it may be assumed that an average or typical 1914 electric property was the basis for the development with no attempt to reflect improvements in the art which might have the effect of changing the weightings.

It should be understood that the index has not been prepared either for general application or for application to any particular property, without suitable adjustments.

This index has two defects, if taken as a measure of the situation in which we now find ourselves. It does not reflect the declining efficiency of labor, and it assumes the reproduction of obsolete plant, which under no circumstances would be reproduced.

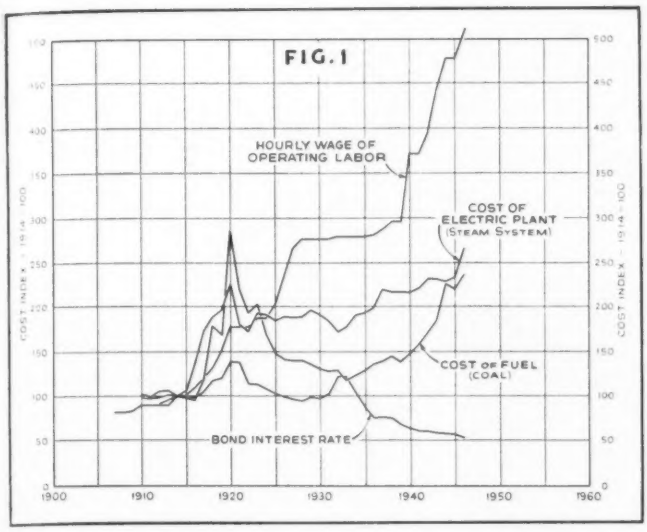
Adjusted Index

An effort has been made, therefore, to develop an index which would reflect both labor efficiency and technological advances. This was not feasible for whole systems, but it appeared that a reasonably sound index for steam power plants might be prepared from the cost records in our own office in view of the fact that we have been constructing steam power stations for nearly 60 years.

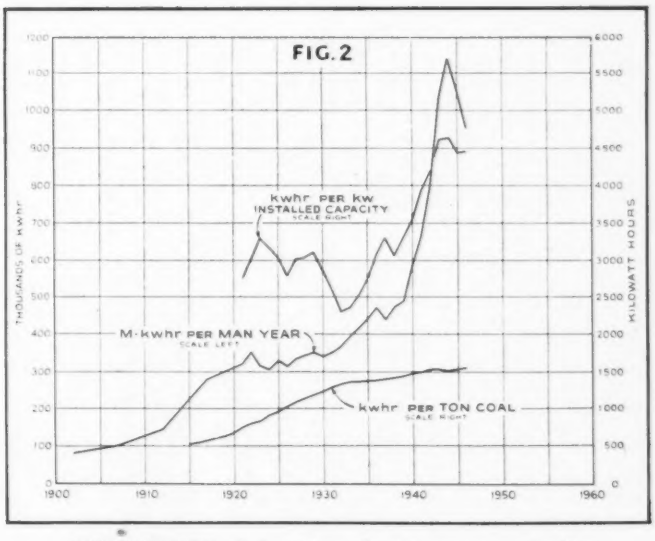
Steam production plant normally constitutes more than 40 percent of total electric plant cost in a system where all power is steam generated. Our index, corresponding to that for combined electric plant shown in Fig. 3 roughly parallels the latter but reaches a considerably higher level as shown in Fig. 4.

Our adjusted index, shown by the heavier line on Fig. 4 purports to reflect advances in the art of generating power by steam. The difference between this line and the unadjusted

* Abstract of paper presented at 1947 annual meeting of Edison Electric Institute.



COST INDEXES of some factors in power production



PRODUCTIVITY of American electric power generation

index is a measure of net reduction in steam power plant cost effected by advances in the art, in spite of the adverse effects of declining efficiency of labor.

Looking into the future, we seem to have reached the period of diminishing returns. We do not presently aspire to larger units, but improved methods of combustion may further reduce cost of steam generating equipment and housing. Neither do we aspire to higher generator speeds, except for the largest units. Improvements in manufacturing methods and genuine standardization may help to reduce equipment costs.

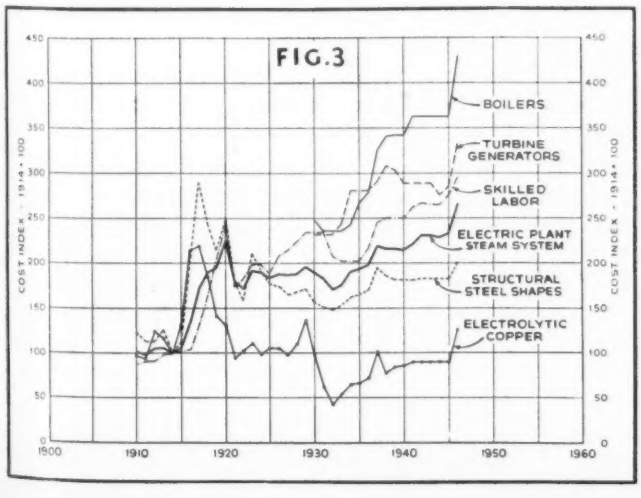
It would be comforting if we could postpone our investment in electric plant until we see what the future brings forth. But we can't wait and see what is going to happen; not in the public utility industry. Already we are running a race with time that we are by no means sure of winning. We have not caught up with where we were going back in 1930. We are not even progressing as fast as we were at that time and the years immediately preceding it.

Capacity wise we have progressed very smoothly from 1,200,000 kw. in 1902 to 34,000,000 kw. in 1930. The continuity was broken by the great depression, but neglecting some irregularity due to war-time construction restrictions, we seem to be making a smooth progression, passing the 50,000,000-kw. mark in 1944 and we have plants under construction that will bring us to 60,000,000 kw. in 1949, if our construction schedules are maintained.

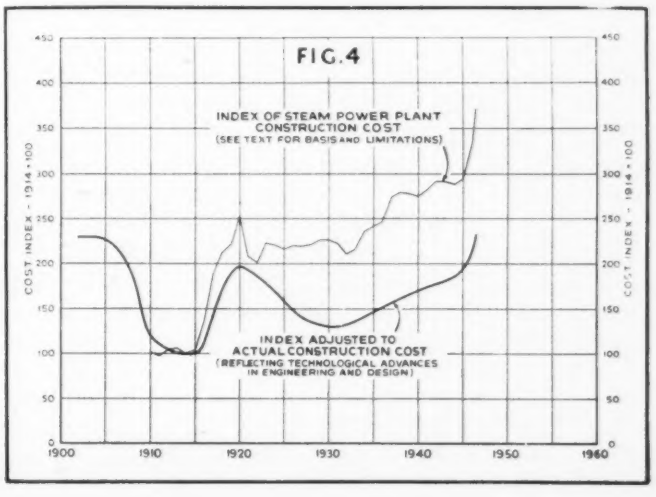
But in spite of the fact that we have more generating equipment on order than at any previous time in the history of the industry, we are not building as fast, comparatively, as we were in the 1920's. Even if we realize our construction schedules, the capacity available in 1949 will not give us what we regarded before the war as essential reserve, unless there is a material recession in the demand for power.

We should not continue construction blindly in complete disregard of present costs. If we cannot postpone the building of essential capacity, we may at least be able to postpone some desirable but nevertheless deferrable items, even at some temporary increase in production expense. Let us spend what we must spend for capacity and reliability, but scrutinize very carefully all optional expenditures for marginal savings in production expense. Particularly we should not be thrown into a panic by present fuel prices and start a mad race for thermal efficiency at the expense of a balance between capital investment and long term production cost.

ELECTRIC PLANT COST INDEX and factors affecting it



INDEX OF STEAM PLANT construction cost, and adjusted index



One Team, One Furrow

RALPH CHAPLIN • Consultant on Labor Relations*

LABOR and management—one team, one furrow!

It is strange that this formula for peace on the production front should be controversial. But it is.

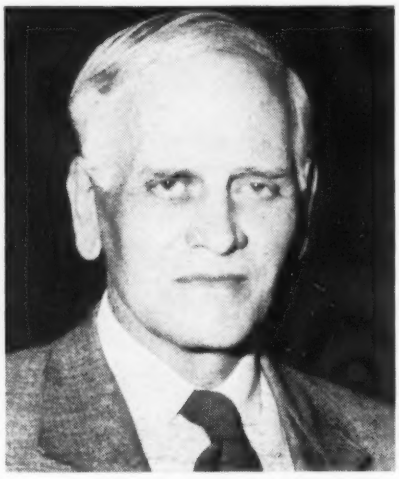
You know, and I know that the long suffering American public is fed up with costly work stoppages; that intermittent industrial paralysis tends to throw our entire economy out of balance; that the results could be disastrous to the best interests of all; and that the majority of American citizens seem convinced that prosperity and security for all of us depend upon teamwork and uninterrupted production rather than disruption and industrial discord.

We have permitted the situation to develop, and we are still permitting it. At the end of that road is a situation in which labor-management relations will be completely out of control. That is what Moscow's Fifth Column in this country is working for.

The Basic Problem

You, gentlemen, are on sure ground when it comes to the mechanics of production. But you are not yet on sure ground when it comes to ideological problems arising out of labor relations. I doubt if you realize the extent to which the productiveness of American industry can be invalidated and vetoed by the negative attitude on the part of your own employees. The answer is to win and hold the confidence of your employees by laying your cards right out on the table, by sharing your problems and responsibilities with them, by winning their trust—and keeping it every day of the year.

We expect something more from you than plausible arguments in defense of private enterprise. It isn't enough that you join us in denouncing communism. You must also help us to formulate American labor policies based on American principles of freedom and fair play—and you must help us to make them stick.



RALPH CHAPLIN

Mr. Chaplin's career embraces activity as labor editor, speaker and organizer. As editor of the "Voice of the Federation" in 1938 he opposed efforts of Harry Bridges and the Communist Party to take over the vital maritime industry. For several years since, he was editor of the "Labor Advocate," publication of the Central Labor Council, A.F.L., in Tacoma. As a free lance writer on labor subjects, he has written many articles for newspapers and magazines

Labor and management can prove it by establishing peace among themselves on the American home front. It is time to bury the hatchet, and the place to bury the hatchet is not in one another's skulls. Few of us in labor or management can afford the luxury of prolonged strikes any more. They are too costly. The conference table looks better to the rank and file of labor than it ever did before. That is one good reason why the employers should not make the mistake of trying to meet the problems of today with the attitudes of yesterday.

I am not disturbed about the future of organized labor, even "radical" labor. As long as freedom prevails in these states and is not altogether extinguished elsewhere, my kind will manage to survive, to learn, and to progress. In a free world, individuals, groups and nations can make mistakes and live to profit by them.

But our real triumph on any front can be achieved only by standing united on American principles.

Labor Parley Needed

A new, carefully worked out national labor policy is needed. This new American labor policy calls for a revitalized American ideology, understandable and acceptable to the rank and file of labor and management, and to the public. It calls for a recognition on the part of both the unions and employers that they are minority groups, and responsible to the American majority.

It demands a realization that neither labor nor management has the right to stop the wheels of key industries, paralyze our economy, halt public transportation and communication, or cut off supplies of food, fuel and vital power services.

It calls for a realization that Big Labor has no more right to become a monopoly than Big Business—and no more right to become dictatorial than Big Government.

It calls for a recognition by every citizen that only through continuous production and distribution can we attain our group objectives and the objectives of the nation as a whole.

It calls for widespread understanding that making profits and declaring dividends are not criminal acts.

It calls for an educational campaign, starting in the front office and including every employee in the plant, every family in the community, to sell the American Idea to the American people and to the world.

It calls for laying cards on the table—the conference table—and calling the cut. Take the mystery out of American business and you will take the curse off it.

*Abstract of paper to 1947 convention of Edison Electric Institute.

Security within Industry

ADAM S. BENNION • Vice-President, Utah Power & Light Co.*

MEN are entitled to protection in their work against the hazard incident to employment in a highly complex social organization. They will insist upon it either from industry or from government. You business men understand that if government provides the program of security, it will do so with your money. The Treasury can furnish only such moneys as are obtained from your institutions and other similar institutions through taxation. Governmental aid is never a gift—it is an assessment.

Employee Security

And so I come to you today with the conviction that American business should include in its plan of operations provision for the security of its employees. All other things being equal, the program set up should be launched upon the principle of mutuality of interests. Both management and men should contribute to the machinery set up. In that case the provisions established smack not at all of charity and they command full-hearted support.

When men talk of security, they like to feel that, barring great reversals, such for instance as a major depression, they can count on going right on working. I like to say that it should be very difficult for a man to get a job with us—and that it should be almost impossible to lose it. For cause, yes—but not because faulty employment methods.

After all, men live by the money they make. A unique sanctity attaches to a man's pay. His family depends upon it. Their whole social well-being rests upon it. In this connection I commend to you the merit of some kind of job evaluation study. Every thoughtful man knows the implications of attempting to put price tags upon fellow human beings. And yet, they must be paid upon some kind of normal schedule.

ADAM S. BENNION

Before joining the Utah Power and Light Co. in 1928, worked in the field of education as high school principal, college professor and commissioner of education. Joined Utah Power and Light in 1928 as director of personnel, became assistant to the president in 1945. He now works almost wholly in the fields of personnel and industrial relations

Making allowances for certain hazardous occupations and those callings which must be followed under more or less adverse circumstances, we are all of us agreed that men should work under conditions conducive to health and well-being.

Advancement—the opportunity to grow and develop—is one aspect of security which merits much more consideration than it receives. Not only are employees entitled to intelligent direction, training and supervision on the job, but they can be stirred to growth under a system of courses for advanced study.

Men are entitled to the fellowship of desirable companions during the hours of work. The satisfaction of congenial camaraderie is an essential in any program of security.

Most of our companies now require physical examinations as part of the employment procedure. I commend the annual physical check-up as a guarantee against incipient sickness of all kinds and as insurance of continued well-being.

Ours is an institution in which hazards abound. Knowledge of the Safety Code—full training in first aid—full training in job analysis—careful day-by-day preview of every job done—are musts in the field of safety as applied to real security.

In spite of best laid plans, employees will get sick. Present practice suggests two provisions for protection in this field. At a very nominal cost, employees can enjoy the benefit of doctors' consultations either in their own homes or at the office of the doctor. The second provision is a comprehensive hospitalization program.

Old Age Security

The fifth concern of all of us is old age. Here again progressive institutions have worked out two helpful solutions—retirement plans with costs borne by employers and thrift plans in which the employee is assisted in his own provision of old-age security.

And that leads me to our concluding consideration—really the concluding consideration of all of us. At very nominal cost, mutual aid protection can be carried so that funeral costs are no longer a harassment. And of course, group insurance programs are now available at so nominal a cost that no employee should go without protection.

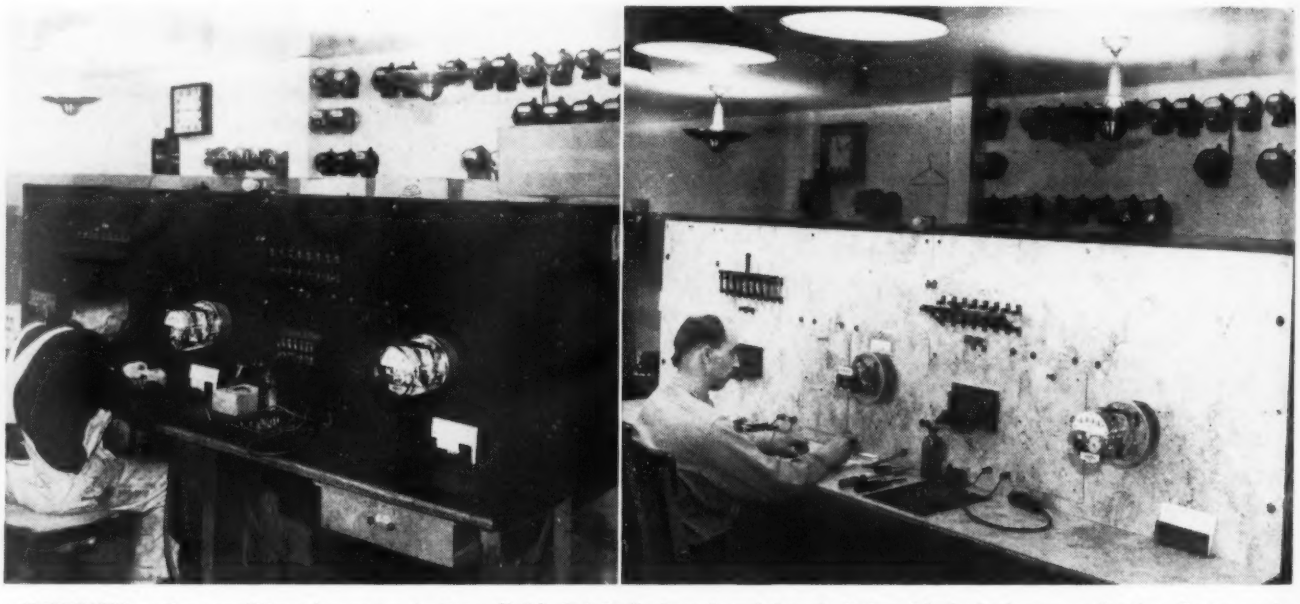
These aspects of security, then, appear to me to be major concerns of the men and women who work for and with us; the job itself—tenure, pay, working conditions, advancement, fellowship—health, safety, sickness, old age, death. Fortunately, they can be met. And as they are—to the mutual benefit of employee and company—they bind us together in bonds that survive all the strains of a complex civilization.

* Abstract of paper to 1947 convention of Edison Electric Institute.

HOW

DESIGN • CONSTRUCT • OPERATE • MAINTAIN

Better Lighting for Meter Test Board



IMPROVED seeing conditions for meter testing—(left) Originally board and bench, being black, had poor reflection factor and illumination was only 10 foot-candles—(right) New overhead lighting raised illumination level to 45 foot-candles and buff-colored linoleum on board improved contrast ratio

CHARLES C. FIELDS
Industrial Consultant
Puget Sound Power & Light Co.
Everett, Wash.

TO IMPROVE seeing conditions at a meter testing board in the Service Building of Puget Sound Power and Light Co. at Everett, Wash., the recommendations and changes made are outlined here. Level of illumination was found to be only 10 foot-candles at work area when meter tester was working in daytime with all available lights burning. A minimum illumination for this type of work is considered to be 75 foot-candles.

One poor seeing condition—Inadequate illumination, even during daytime. A window did not provide sufficient light at any time. Artificial light was provided by one 750-watt lamp enclosed in a glass diffusing bowl, mounted 7 ft. above floor, about middle of test board, and above tester's head. With single, inadequate light source and window behind men at board, shadows were definitely a problem.

To provide adequate illumination at all times, 4 RLM dome reflectors equipped with 500-watt silver bowl lamps were recommended to be installed in a row above the work bench. Reflectors to be mounted flush with ceiling and 5 ft. in from west wall of building. Two end units to be installed with outside edges of reflectors directly over edge of work bench; other two units spaced at equal distances between.

Reflecting Surface

Another poor condition—Construction of testing board and bench. These being black had a reflection factor of approximately 2 percent, practically no light reached the work from the board side of bench. In addition, black surface of board presented too great a contrast from other surfaces and areas in room. This condition in itself placed an added burden on the eyes.

To correct this condition, a recommendation was made that entire surface of work bench and test board be covered with a solid colored linoleum in pastel shade having a reflection factor of approximately 50 percent. A medium light green or a blue-gray was suggested because (1) these shades leave an impression of coolness, (2) cool colors tend to make surfaces recede, (3) these shades are restful to the eyes. If those colors should not be available, any pastel color with same reflection factor would suffice, for example buff, gray or orchid. If reflecting surface is too light, the large bright area directly in worker's vision would create a glare hazard; if surface is too dark, there will be poor light reflection and too great contrast.

Additional recommendation: Testing board to be extended up from present height (29½ in.) to the ceil-

ing (an additional 33⅓ in.). This would provide a reflecting surface for light rays which are lost over top of board.

Foregoing recommendations would provide at a nominal cost a satisfactory level of illumination for the work. For further economy, testing board could be painted with a flat paint in some shade recommended above instead of covering with linoleum. Bench, in any event, should be covered with linoleum as recommended. Square of linoleum should be fastened to board where meters are hung in order to withstand hard usage.

Lighting as installed and other changes made are presented here.

Inlaid linoleum of any design or style is practically impossible to secure and probably will be unavailable for some time. Thus instead of a solid light-green or gray-blue, a buff-colored, marbleized linoleum with approximately 70 percent reflection factor was substituted. And since the quantity available was limited, the back of the test board could not be extended to the ceiling as recommended.

Because silver bowl lamps were not procurable at the time, inside frosted lamps were being used temporarily. However, the latter lamp in the size recommended apparently generates sufficient heat to be objectionable to men working at the board. The result is that in place of four 500-watt silver bowl lamps, there are two 200-watt lamps at the ends and two 150-watt lamps in the center units. It is thought that when silver bowl lamps are again available, the wattage can be increased to recommended size without too much objection, psychological or physical, from the men working on the board.

Complaints regarding the heat are not new since this was a justified complaint before new lighting, chiefly because of poor ventilation and the low ceiling. The heat factor was considered in preparing the recommendation, with fluorescent in mind. However, for the type of work performed, it was felt that fluorescent did not have sufficient punch or penetration.

Aim: 80 Foot-Candles

The luminaires recommended and installed were Guth Industrial Dome Reflectors. Although lamps of lower wattage were substituted, foot-candles on the bench have been increased from 10 to 45, even with the tester leaning over his work. The illumination level will, with proper size of lamps, be increased to approximately 80 foot-candles. The improved conditions will naturally increase the efficiency of the workers.

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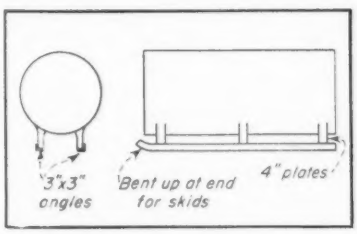
Tank With Skids For Hauling Oil



OIL STORAGE and transport for transformer filling is easier with this tank with skids

SKIDS and supporting legs have been added to an oil tank which is being used for the purpose of storage and for hauling oil to various substations of the Gulf States Utilities Co., Beaumont, Texas.

The tank holds approximately 570 gal. Legs are made of 4 in. plates. Angles 3 in. by 3 in. form the skids and they are bent at the end to permit easy sliding when the tank is pulled on to a truck for hauling.

How to Design a 2-Pole Regulator Platform

TO FACILITATE the construction of a 2-pole regulator platform, using wooden arms where steel is unobtainable or undesirable, the New England Power System has established the standard illustrated, allowing flexibility in layout to meet the requirements of regulators as needed. In field work, plans for specific installations are required to give the location of the platform and pole length; to show the line extension to the platform if necessary; specify guys and show locations, including side guying if needed; show complete pole top layout with connections (those illustrated are typical); and give required details of regulators and wiring diagram. Grounds are to be installed, using one for arrester and the other for regulator cases. If the center line of the structure would be less than

List of Principal Material Required for 2-Pole Regulator Platform

(Item numbers embracing screws, lockwashers, nuts, etc., are omitted here)

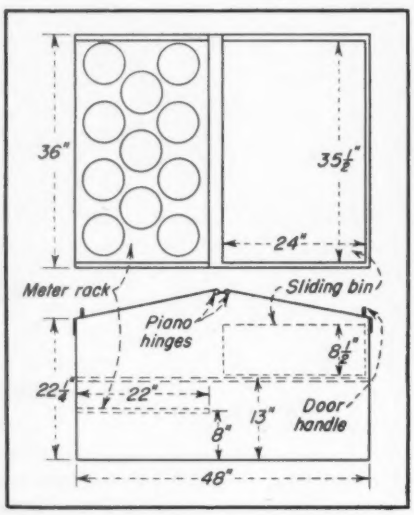
Item Number	Quantity	Description
1	2	Poles, length as required
2	4	6-pin crossarms
3	12	Insulator pins
4	12	Pin insulators
5	2	Voltage regulators, 150/300 amp., 10/5% Max. Typical
6	5	Lightning arresters
7	As required	Guys
8	3	Ground connections
9	2	7-in., 98-lb. channels, 13 ft. 6 in. long
10	4	Steel crossarms, 4-in. x 4¼-in. x 10 ft.
11	2	Plank creosoted pine, 2 in. x 7 in. x 14 ft.
12	16	Plank creosoted pine, 2 in. x 7 in. x 10 ft.
13	—	Crossarm stock 13 ft. long
14	4	Angle braces
15	2	Bypass disconnecting switches
16	2	Guy insulators
17	2	Disconnecting switches, 5 kv.
18	6	Deadends
19	As required	Triple braid weatherproof wire
24	2	Drop insulators
29	As required	Solderless connectors
33	" "	1½-in. galvanized pipe and fittings
34	" "	1-in. conduit and fittings
36	" "	Rubber-covered wire, 5-kv.

10 ft. from the edge of the highway pavement, the platform height must be 15 ft. If soil conditions are swampy, a 4-pole regulator platform or reinforcement of the 2-pole design may be needed. An intermediate cross member is required if the distance from the conductor deadends to the center line of the upper crossarm exceeds 7 ft. If steel arms are unavailable, 10-ft. wood arms are substituted, with other changes in bolts and washers, not detailed here.

•

Truck Tool Box Has Rack for Meters

I. H. McNEIL
Supt. of Distribution
Omaha Public Power District
Omaha, Neb.

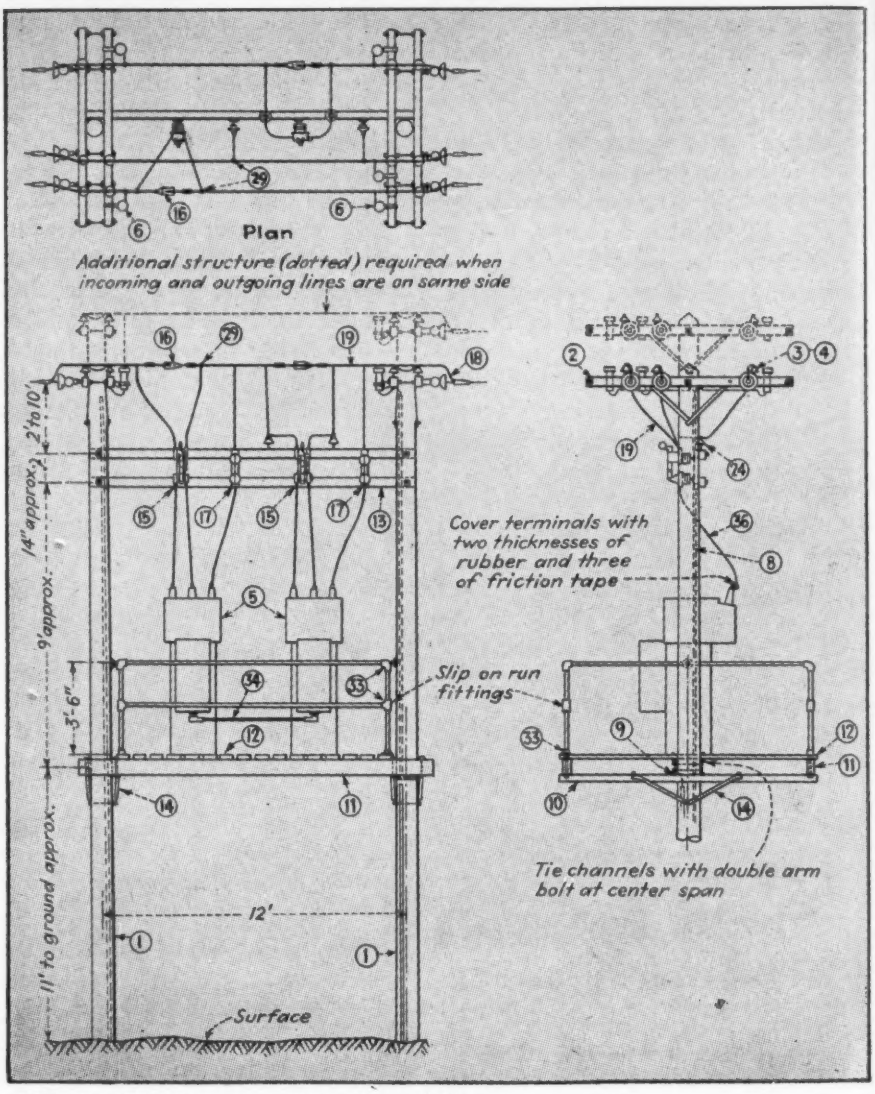


SECURE RACK for Type S meters is provided in this service truck tool box

SPACE FOR METERS as well as tools and supplies is provided in the truck box illustrated. Designed for use on open service trucks, the box is weatherproof and has cover doors opening from either side of the truck. It is fabricated from 16-gage or 18-gage sheet steel.

Small tools are carried in a bin arranged for access through either door by sliding on angle iron guides. Supplies and other tools are stored in the section below the sliding bin.

Space for eleven Type S meters is provided on a ¾-in. plywood rack with 6⅜-in. holes, mounted horizontally and sheeted with rubber.


Plan
Additional structure (dotted) required when incoming and outgoing lines are on same side
Cover terminals with two thicknesses of rubber and three of friction tape
Slip on run fittings
Tie channels with double arm bolt at center span
12'
Surface

DESIGN DETAILS of two-unit regulator platform

Russians Cut Metal by Spark Erosion

EXPANSIVE CLAIMS are made for a new Russian process which cuts, bores, engraves, slots, laps, and coats metals with no other tools than copper-graphite electrodes. The removal or deposition of metal is obtained by a succession of sparks at a controlled rate. According to Russian technical journals the process may eliminate all the present use of cutting tools.

The work is placed in an oil bath and over it is suspended the electromagnet which "jiggles" the tool-electrode up and down. The rod is the cathode, the plate the anode for the sparks which proceed to erode the metal ahead of the electrode. An arc is avoided and with it the heating and its effect on the metal. Once the spark action has been set up it is claimed that it is not necessary for the electrode to make contact with the work.

Conventional cutting tools "ground" by such erosion are said to be tougher and more durable than those sharpened by abrasive wheels. Good cohesion is obtained, the Russians say, when metals are deposited by reversal of polarity. The strangest claim is that after comprehensive application of the new process "only a minimum of electric power" will thereafter be required for machining operations.

N_2-Filled gap chamber assures A NEW HIGH IN RELIABILITY

Pellet arresters have these exclusive CONSTRUCTION features:

1. All air and atmospheric moisture (usually sealed in the arrester with *ordinary* manufacturing methods) are completely evacuated from the gap chamber.

This positively excludes the moisture of normal atmospheric humidity from the series gaps of the arrester, thus eliminating oxygen, the essential agent for ozone and all forms of oxidation, and eliminating the recognized adverse effects of internal condensation ("dewing") caused by changes in outdoor temperature.

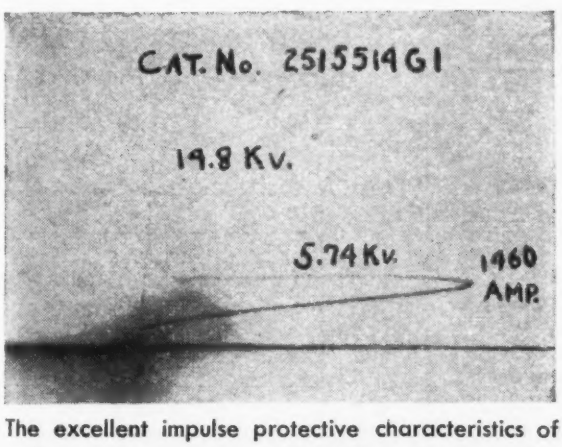
2. A vacuum test assures tightness of gasket seals.

The evacuation of air and moisture provides an error-proof, routine, vacuum-withstand test of the main sealing of each arrester. Thus, any unit having the slightest leak is detected and rejected.

3. Dry nitrogen (N_2) is injected into the gap chamber, and the small "treating" hole in the metal cap is immediately solder-sealed.

The injected dry-nitrogen permanently sealed in the gap chamber is *inert*. It prevents the formation of any ozone or oxides; keeps the gap electrodes bright as new during years of service operation, and gives more stable gap-sparkover characteristics.

Pellet arresters are also distinguished by these outstanding ELECTRICAL characteristics:



The excellent impulse protective characteristics of pellet arresters *stay excellent*. Here is an oscillogram of a 3-kv pellet arrester *after 18 years of continuous service operation*. The arrester was manufactured in 1924.

1. Low impulse breakdown voltage to start discharge.

2. Exceptionally low IR drop, even at high discharge currents.

3. Large discharge capacity for severe lightning strokes.

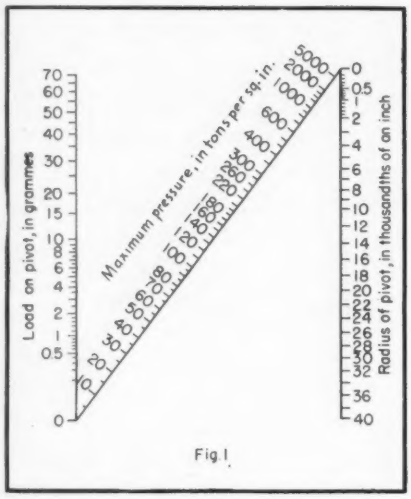
4. Valve action; no exposed live parts or arc flame. Pellet arresters can be used on *any* part of *any* distribution system, rural or urban.

Ask for Bulletin GEA-2975 for complete information on G-E pellet arresters. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

Design Nomograms for Meter Pivot Bearings

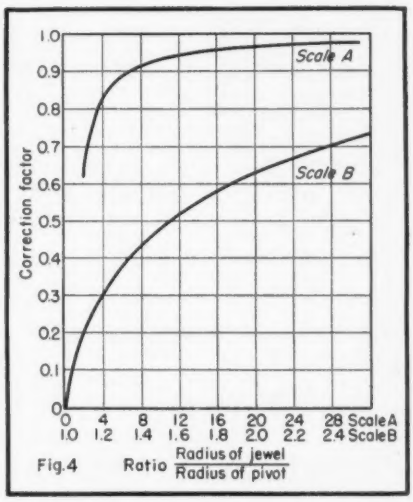
Accompanying nomograms and curves are adapted from a paper, "Meter and Instrument Jewels and Pivots," by G. F. Shotter, published in the *Journal of The Institution of Electrical Engineers*, 1946, Vol. 93, Part II, page 15.



MAXIMUM PRESSURE obtained between steel pivot and flat sapphire jewels. To correct for radius of a dished jewel, multiply maximum pressure by correction factor from curve Fig. 4

NOMOGRAMS, Figs. 1, 2 and 3, give the relations between various factors involved in bearing design composed of steel pivots and flat sapphire jewels.

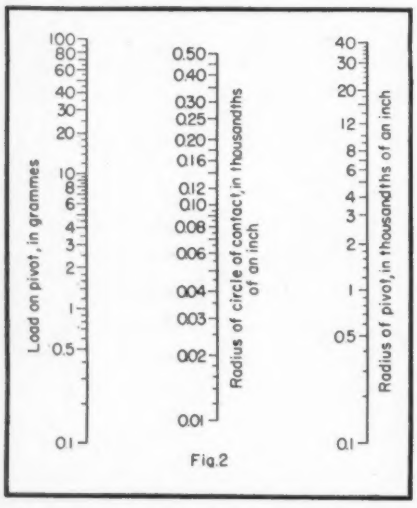
Graph, Fig. 4, gives the correction factor for various ratios of jewel radius and pivot radius to be applied to the nomogram Fig. 1. The correction curve, Fig. 5, is for nomograms Figs. 2 and 3. To obtain the average pressure, the maximum figure given by the nomogram should be multiplied by $\frac{2}{3}$.



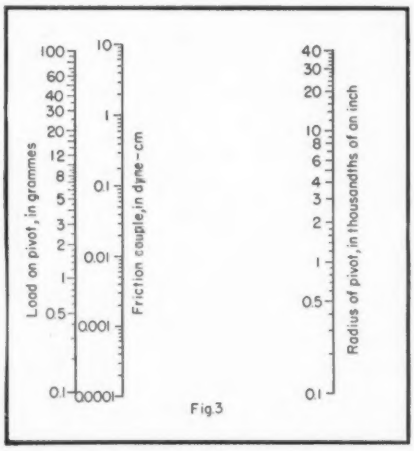
CORRECTION CURVE, to be used in conjunction with nomogram Fig. 1, to allow for jewel of finite radius.

$$\text{Correction factor} = \left(\frac{\alpha - 1}{\alpha}\right)^{2/3}$$

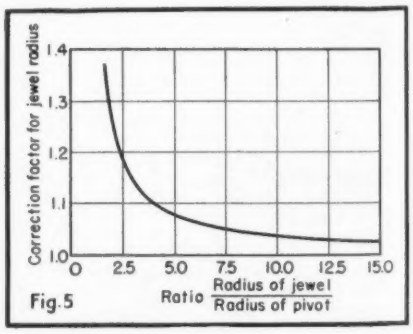
where α = jewel radius/pivot radius


Load on pivot, in grammes
Radius of circle of contact, in thousandths of an inch
Radius of pivot, in thousandths of an inch
Fig.2

RADIUS of circle of contact obtained between steel pivot and flat sapphire jewels. To correct for radius of dished jewel multiply radius of circle of contact by correction factor from Fig. 5



FRICTION COUPLE obtained between steel pivot and flat jewel, assuming a coefficient of friction of 0.1. For any other coefficient of friction, μ, multiply friction couple by $\mu/0.1$; to correct for jewel radius multiply friction couple by correction factor from Fig. 5



CORRECTION CURVE, to be used in conjunction with nomograms Figs. 2 and 3, to allow for jewel of finite radius.

$$\text{Correction factor} = \left(\frac{\alpha - 1}{\alpha}\right)^{1/3}$$

where α = jewel radius/pivot radius

G-E *FLUORESCENT* BALLASTS

can help you win favor for your fixtures

One good way to start and wind up a sales story on fluorescent fixtures is to say, "... *the ballasts are G-E.*"

There's a reason for people's confidence in that name. With fluorescent lamp ballasts, it's the everlastingly watchful testing of raw materials and control of manufacturing processes which G-E maintains

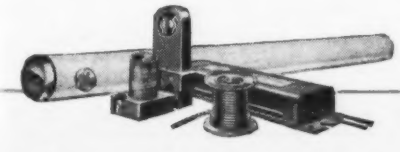
More than 20 tests assure the uniform quality of all ballast components. Completed ballasts are tested continually for voltage, heating and lighting characteristics. Finally, production line samples are subjected to *independent* tests by the Electrical Testing Laboratories*.

Silent salesman

The quiet operation of G-E ballasts can help a lot to *keep* your fixtures sold. So will the assurance they give of rated light output and freedom from maintenance expense. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

We realize you are not getting all the G-E ballasts you need as quickly as you want them, but please remember that we are doing our utmost to increase production, despite continuing material shortages.

BALLASTS LAMPS STARTERS CABLE LAMPHOLDERS for DEPENDABILITY in fluorescent lighting



*Also listed by Underwriter's Laboratories, Inc.

GENERAL ELECTRIC

412-3-5205

Check Electrical Characteristics Of Fluorescent Lamp Circuit . . . III*

HARRIS REINHARDT
Manager, Commercial Engineering Dept.
Sylvania Electric Products Inc.
Salem, Mass.

This procedure has been developed for checking fluorescent fixtures where it is thought that the lamp performance is not up to standard. The test kit and data were outlined in Part II of this series of articles

1—LINE VOLTAGE AND 2—OPEN-CIRCUIT VOLTAGE

IN THE CASE of ballasts which do not include an autotransformer such as the ballast for 14, 15, and 20-watt lamps on 110-125-volt circuits, or the ballast for 30 or 40-watt lamps on 199-216 or 220-250-volt circuits, the line voltage is the same as the open-circuit voltage which can be measured by plugging the dummy starter of the test kit into the fixture with the switch thrown to the voltmeter side and reading the voltage with the fixture turned on and a lamp in place but not lighted. Except for a slight voltage drop caused by the current taken by the voltmeter, this is the line voltage at the fixture. In any measurement of this type it is usually desirable to have all other lamps and other electrical equipment normally operated on the same circuit turned on while the measurements are being made.

In the kit (Fig. 1) the voltmeter normally reads on the 0-300-volt scale. If the reading is less than 150 volts the button should be depressed to switch to the 0-150-volt scale for a more accurate reading. If the ballast is one which includes an autotransformer, this measurement will be the open-circuit voltage. This open-circuit voltage is directly proportional to the line voltage, so a low open-circuit voltage indicates the possibility that the line voltage may be low, and if the reading is significantly low, it may be worthwhile to check further into this possibility. The first step should be to measure the voltage at the panel board. If the voltage there is low, steps should be taken to have it corrected. If the voltage at the panel board is O.K., it may be considered worthwhile in some instances to expose the wiring at the fixture in order that the line voltage may be measured by connecting a voltmeter directly across the terminals.

If the line voltage measured in this manner, with all other lamps and electrical equipment normally operated in this same circuit turned on, is found to be low but is O.K. when all the lamps and other equipment is turned off, it indicates that the wiring is inadequate for the load being carried by the circuit.

If the open-circuit voltage of a ballast which includes an autotransformer should be on the order of 200 volts but is found to be in the range of 110-125 volts, it indicates that the autotransformer portion of the ballast windings has been left out of the circuit as by an open circuit in the windings or in the connection to them.

3—STARTING CURRENT

When the s.p.d.t. switch in the test kit is thrown to the "ammeter" position, the preheating current may be read on the ammeter. At this stage the ends of the lamps should glow in a normal preheating manner and the current should fall, roughly, within the limits given in Table 1 under "Preheat or Starting Current Range."

4—LAMP OPERATING VOLTAGE

When the s.p.d.t. switch is thrown back to the "voltmeter" position, the lamp should light. If the lamp fails to light the switch should be thrown back to the "ammeter" position, a short time allowed for the electrodes again to preheat, and the operation repeated. When the lamp is lighted the operating voltage may be read directly on the voltmeter. If the operating voltage of the lamp is low, it indicates that the operating current is high, and vice versa. If the lamp voltage seems obviously outside the range, it is suggested that the above measurements be repeated using a lamp which is known to give normal readings in another circuit.

5—LAMP OPERATING CURRENT

In instances where the lamp operating voltage is definitely out of range, it may be desired to measure the lamp operating current. This requires a special adapter consisting of a dummy lamp end, a lampholder, and a starter socket connected in series as shown in Fig. 2. One end of the lamp is removed from the fixture and inserted in the lampholder of the adapter, the dummy lamp base of the adapter being plugged into the lampholder in the fixture vacated by the lamp end which has been removed. The test kit is plugged into the starter socket with the s.p.d.t. switch thrown to the ammeter position. The starter must be in its normal position in the fixtures, and if all the connections are properly made the lamp should light at this point. The ammeter will read the lamp current when the lamp lights. If the ammeter reads zero it means that the ammeter is connected in the starter side of the lampholder and the position of the pins of the dummy fluorescent lamp base in the lampholder must be reversed to get into the correct side of the circuit for measuring the lamp current. This can be overcome by incorporating a reversing switch in the circuit to the dummy fluorescent lamp base as shown in the alternate circuit in Fig. 2. Measuring lamp operating current while on a high ladder is not recommended unless it seems very essential that the measurement be made.

In instances where numerous measurements of lamp operating current are to be made, a test kit incorporating an arrangement for removing the lamp from the fixture and plugging in dummy lamp ends connected to a lamp in the test kit can be devised.

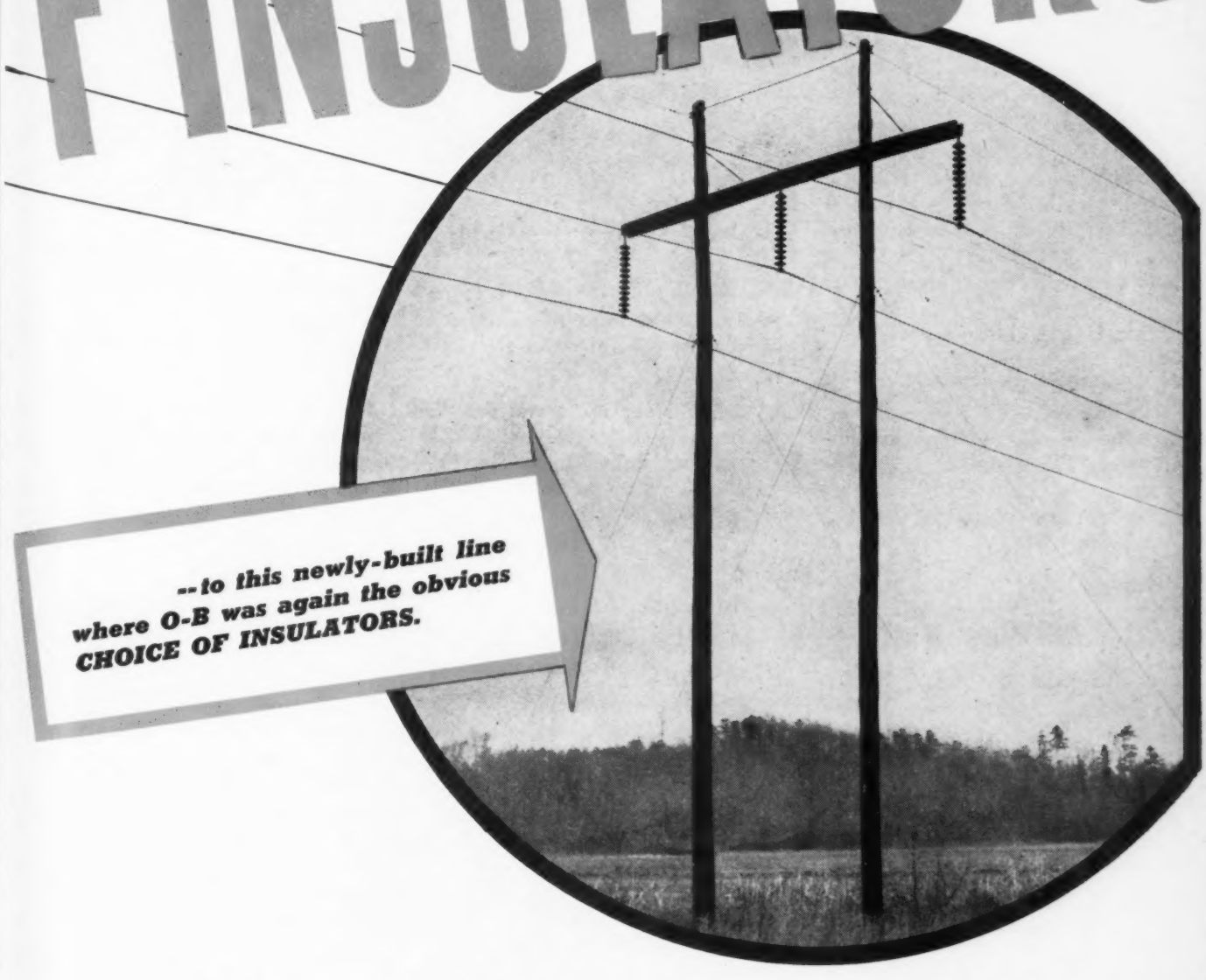
100-WATT LAMP CIRCUITS

Since 100-watt fluorescent lamp circuits normally employ a four-contact starter, a different circuit arrangement (Fig. 3) may be used in making a test kit for lamps of this size. Current and voltage values to be used in measurements on 100-watt lamps are given in Table 2. This arrangement permits the measurement of lamp operating current without the use of a special adapter. Otherwise the testing procedure is the same as outlined for the 15- to 40-watt fluorescent lamps.

* Concludes the series of articles published in ELECTRICAL WORLD, May 10, 1947, page 108, and May 24, 1947, page 138.

TOP PERFORMANCE

F INSULATORS



--to this newly-built line where O-B was again the obvious ***CHOICE OF INSULATORS.***

Ohio Brass

2748-H

MANSFIELD, OHIO

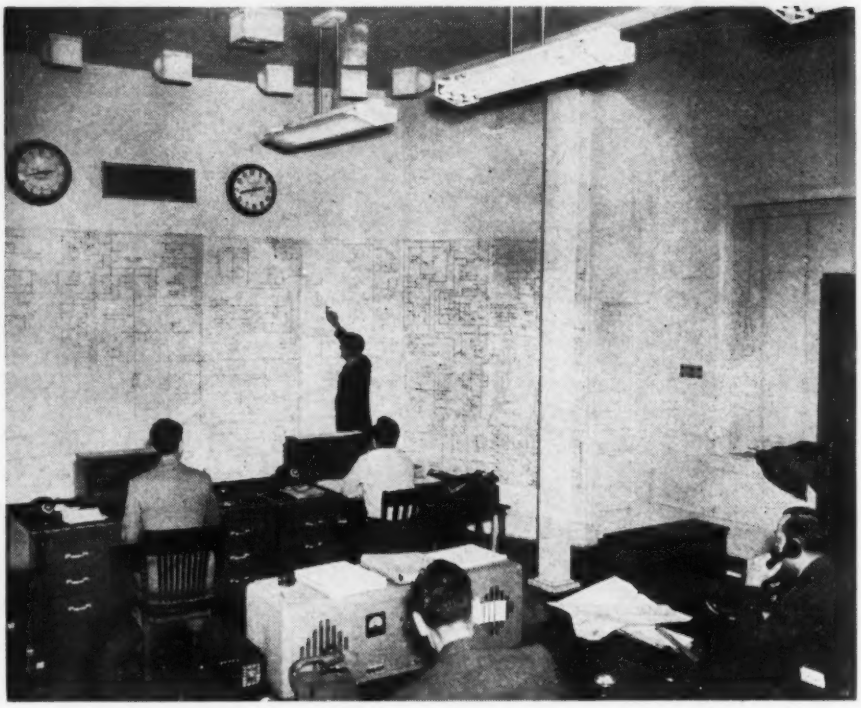
Canadian Ohio Brass Company, Limited
Niagara Falls, - - - Ontario

HEADQUARTERS FOR PORCELAIN INSULATION

New Dispatching Office Has Model Communications

FM RADIO, interconnected telephone turrets, spot lighting, air conditioning and six different phone systems are all combined in the South Carolina Power Co.'s new dispatching room. On a 7 by 27-ft. schematic map, the company's system is laid out in a single-line diagram, constructed of 21 by 36-in. sections of Lamicoid. Any section can be removed and made up-to-date when the addition of system facilities makes such a move necessary. Large red and yellow tags are used to denote switching operations and are easily seen from any of the desks.

Dispatching is handled by means of telephone and radio. The FM radio is in contact with 37 trucks and cars used by the company in its territory. These vehicles are equipped with two-way radios. Use of the radio system has grown greatly since it was installed last year. Carrier current is used for communication between the company and the South Carolina Electric and Gas Co. in Columbia. A special line leased from the telephone company runs throughout most of the system. Interoffice phones as well as several direct outside lines are available in the dispatching room for use in an emergency.



FM RADIO FACILITIES are centralized at South Carolina Power Co.'s new system operating headquarters, above. Air conditioning and spotlighting improve working conditions

The new single-line diagram board was constructed by the company's transmission engineers working with George Dibble, relay engineer. Operation of the new office will be under the supervision of William E. LeCroy, newly appointed chief dispatcher for the company, who heads a staff of eight dispatchers.

• • •

Balloon Is Sky-Hook for Test Antenna

S. C. BARTLETT
Electrical Engineering Division
American Gas & Electric Service Corp.
New York

IN THE construction of fixed radio stations for use with mobile equipment there are always questions regarding the proper site and the height of the mast necessary to provide adequate coverage. Study of topographical charts provides only a small part of the necessary information. Radio-absorption characteristics of the earth, location of the ground plane, and the reflections from material beneath or above the ground surface collectively cause loss of signal strength or out-of-phase addition of signals arriving by several paths.

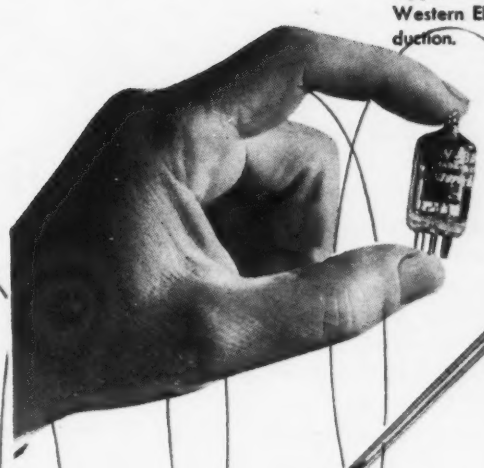
Observations of either transmitting range or noise at ground level shed little or no light on performance characteristics at 100, 150, or 200-ft. elevations. The only way to be sure a station will provide the performance desired has been to mount an antenna at the site and measure the performance at several different elevations.

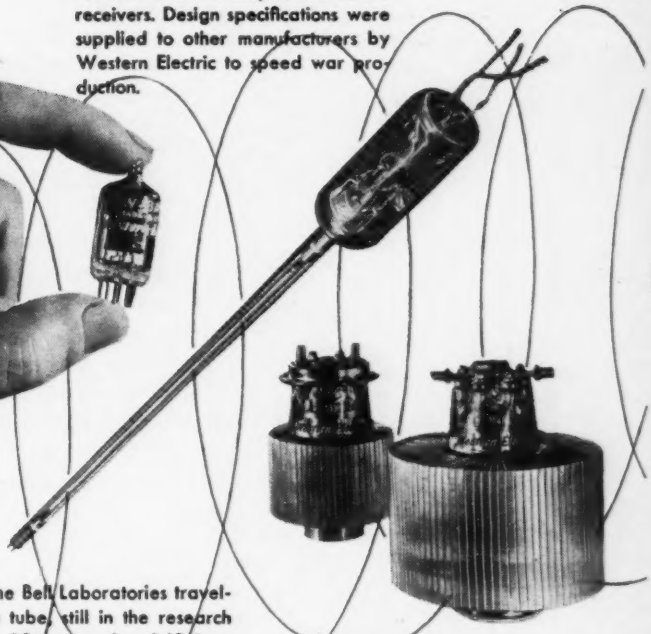
For such cases the Indiana & Michigan Electric Co. recently purchased a barrage balloon from surplus military equipment. It will support a suspension-type half-wave antenna having characteristics similar to the fixed-station antenna, and 200 ft. of coaxial cable which will reach down to the ground and be connected to a 2-way mobile radio unit. This balloon is about 25 ft. long, total weight about 40 pounds. Filled with hydrogen (1,100 cu.ft.) it provides a useful lift of about 50 lb.

In three successive days the company conducted tests at three different locations. At Mishawaka, Ind., it was found that a 200-ft. mast at the west end of the station yard would provide satisfactory coverage and that the radio noise from the 27-kv. and 132-kv. yards would not be objectionable. At Benton Harbor, Mich., it was found that resultant coverage with any mast up to 200 ft. would be unsatisfactory; at Buchanan, Mich., it was shown that satisfactory coverage would be obtained by raising the antenna to 200 ft. without the necessity of relocating the entire station.

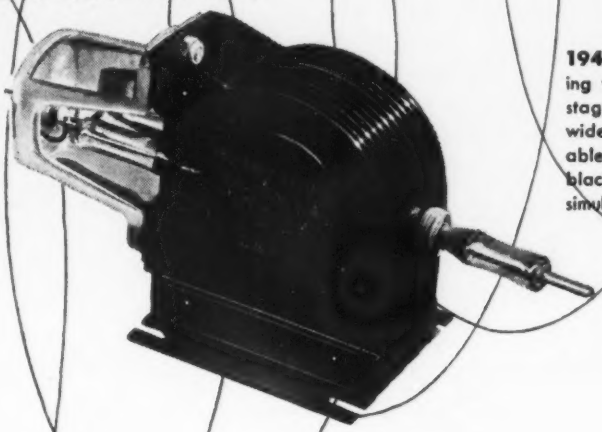
In general, the cost of conducting

1942. This tiny 6AK5, operating in the vicinity of 400 mc, proved itself invaluable as an amplifier in radar receivers. Design specifications were supplied to other manufacturers by Western Electric to speed war production.





1940. Bell Laboratories produced the first American multicavity pulsed magnetron from a British model. The team of Western Electric and Bell Laboratories developed 75 new and improved magnetron designs by extending operation into the 10 cm, 3 cm and finally the 1 cm bands, and produced over 300,000 of these wonder tubes of World War II.



1945. The Bell Laboratories traveling wave tube, still in the research stage, amplifies over a band 40 times wider than present tubes—may be able to amplify dozens of color or black and white television programs simultaneously.

TODAY. These new forced air cooled FM transmitting triodes are among the latest in the line of tubes designed by Bell Telephone Laboratories and made by Western Electric. Their thoriated tungsten filaments, rugged construction, flexible terminal arrangements and many other features make them tops in performance in the 88 to 108 mc band.

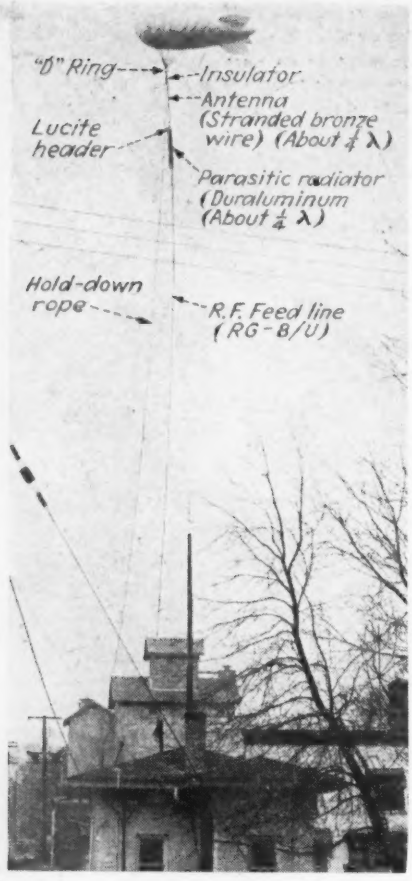
OVER 34 years ago in the laboratories of Western Electric, De Forest's Audion was improved and developed into the high vacuum tube and put to work for the first time amplifying telephone and radio frequency currents. And *for over 34 years* Western Electric and its research associate Bell Telephone Laboratories have been foremost in designing new and better electron tubes. Every tube shown here and many developments *basic* to the tube art are examples of that leadership. More than 10 years ago, for instance, Bell Laboratories first used microchemistry to determine what gases were destructive to tube elements, and with Western Electric developed a manufacturing technique to keep these damaging elements out—thus increasing tube life many-fold. Every one of the more than 300 codes of electron tubes now being made by Western Electric from Bell Laboratories' designs has the same unequalled background of research and manufacturing skill.

BELL TELEPHONE LABORATORIES

World's largest organization devoted exclusively to research and development in all phases of electrical communications.

Western Electric

Manufacturing unit of the Bell System and the nation's largest producer of communications equipment.



SURPLUS BARRAGE BALLOON suspends antenna in tests made to fix advantageous location of fixed radio stations for mobile communication

tests at any location will be small. Actual costs of the major items are as follows: (1) barrage balloon (from surplus military stores), $70; (2) suspension-type antenna, $30; (3) 200-ft. coaxial cable, $16; (4) hydrogen gas (1,100 cu. ft.), $20; (5) labor (one location), 40 man-hours.

About six tanks of hydrogen gas are required for one filling of the balloon. It was found that the simplest and most satisfactory method of filling was to clamp a standard garden hose to the reducing valve on the hydrogen tank. This hose provided sufficient cross-section so that an entire tank could be emptied in five or six minutes. For convenience in handling the inflated balloon a light truck with a winch was used.

All conceivable precautions were taken to avoid sparks or static electricity until the balloon was well in the air. At the end of each test the balloon was hauled down and deflated immediately. No attempt was made to save the hydrogen, since its cost is too low to warrant the hazard involved. The hydrogen is removed from the balloon by rolling it on the ground, starting simultaneously at both ends. In about ten minutes it can be completely emptied and folded up readily for storage. The balloon fits into a duffle bag about two feet high and one foot in diameter. The fins are stored in a plywood case measuring about 4 ft. x 5 ft. x 6 in.

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Meter Shocks Absorbed By Sponge Rubber

SPONGE RUBBER ½ in. thick on the bottom of portable test meter saves Coast Counties Gas & Electric Co., Santa Cruz, Calif., many a damaged instrument from repeatedly setting the standard down, frequently on concrete floors. It was H. D. Noren's idea

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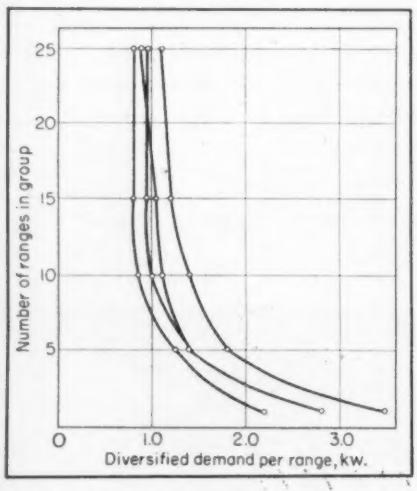
An ELECTRICAL WORLD *Comparison of Practice*

Transformer Load Estimates Depend on Tests and Uses...II*



ESTIMATES of diversified demands for ranges fall in narrow band with 15 or more in group, but diverge for one to five ranges

COMPARISON of demands used in estimating transformer loads for lights and small appliances (ELECTRICAL WORLD, May 24, 1947) showed a wide spread, partly because of variations in the further interpretation included in the chart or nomograph of the method. These values are seldom used as units alone, but they are combined with the other factors of diversity, range demand and allowances for load increase and operating practices.

A general conclusion from many tests, which is reflected in the estimating methods, is that load factors for this classification of load are practically constant within a relatively narrow band—30 to 35 percent. Also, very little change is made for diversity in estimating for more than 20 services. Although the exact values of the factor for five or ten services tend to spread, as shown in the accompanying curves, this is relatively less important in practical application for transformer size selection.

Range Demand

Test information for diversified range demand is much more extensive than for lighting and appliances. Probably this is the result of demand charts and accurate records of range installations being used for transformer load determination, where simple spot tests have been most common with lighting loads. The values shown on the accompanying curves,

* This series began in ELECTRICAL WORLD, May 24, 1947, page 132.

How to Solve Your Lighting Problems in 2 Easy Steps!

...Get A Lighting Plan from the "Man Who Plans"!

Modern lighting is a technical, complex science.

Only trained experts are qualified to engineer lighting so that it delivers all the benefits you should expect.

To be safe—be sure to get sound lighting advice. Consult the Lighting Engineers with your local Light & Power Company, or your Architect.

2...Get Good Guth Fixtures!

For 45 years, GUTH has been outstandingly successful in designing and building Lighting Fixtures. Today, each model of GUTH Fluorescents and Incandescents is scientifically created to give best lighting efficiency and economy.

Back up a good Lighting Plan with good Lighting Fixtures—insist on GUTH!

THIS ADVERTISEMENT IS RUNNING IN MAGAZINES LIKE FORTUNE, NEWSWEEK, ETC., TO HELP SELL THE AMERICAN BUSINESS MAN ON THE ADVANTAGES OF

FOR THE BEST IN LIGHTING FIRST GET A PLAN FROM THE MAN WHO PLANS

SEE YOUR LOCAL LIGHT & POWER CO.

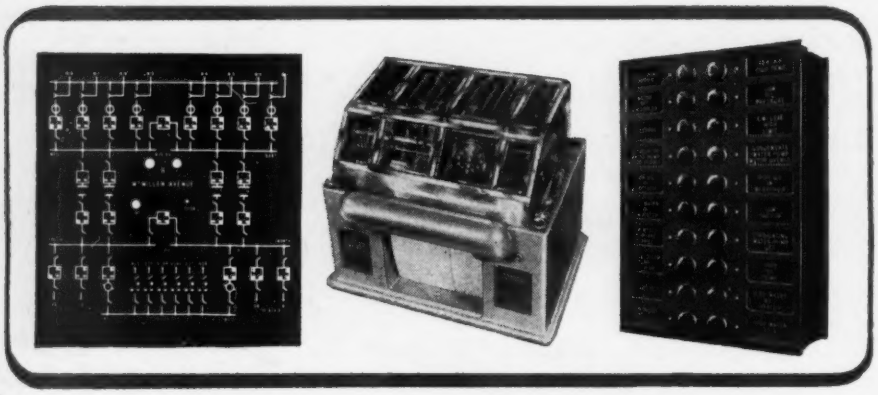
EDWIN F. GUTH CO.
ST. LOUIS
Leaders in Lighting Since 1902

Guth Planned Lighting!

Maintain CONTINUITY of SERVICE with

"Autocall" centralized supervision!

Excess pressure or temperature in transformers . . . pressure loss in oil-filled cables . . . movements of remote circuit breakers . . . overheated bearings. In fact, the occurrence of *any* event that is physically perceptible may be automatically and instantly known to responsible personnel by means of "Autocall" supervisory equipment!



"Autocall" centralized supervision helps you maintain continuity of service by reducing the possible loss of life, load and equipment. Typical equipment to provide this service is shown above. From left to right:

"Autocall" Diagram Board, (typical section shown), made in a variety of sizes and styles according to the requirements of the user;

The "Autocall" Printing Recorder, which automatically prints, in plain English, a log record of all station operations;

Type "ANF-20" lamp-type annunciator - a versatile all-purpose unit, may be made up of as many illuminated designations as desired.

A complete, illustrated listing of "Autocall" supervisory and remote control equipment for *all* generating and distributing systems, large or small, may be obtained without obligation. Send for your copy TODAY!

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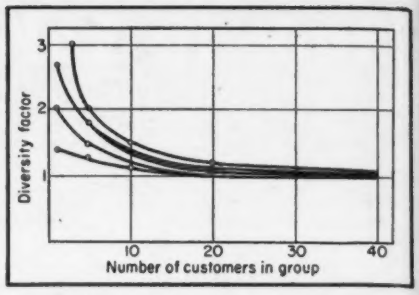


DIVERSITY of lighting and appliance demands becomes constant above about 20 services but varies for lesser number

from load estimating charts of ten companies, are therefore more reliable and more in agreement than the demand estimates for lighting and smaller appliances. Several companies use a simple estimate of 1 kw. per range service in groups, increasing to 3 kw. for one range.

There is very little information available on the diversity between lighting and small appliances and the demands of ranges. Two reports have shown that 90 percent of the demand of ranges should be added to the lighting demand estimate or that 15 percent of the lighting demand should be added to the range estimate. In several cases, however, the demand of services with ranges is added at full value to the demand estimated for services without ranges.

The load of electric water heating presents a special problem because of the variations in ratings and in controls for off-peak operation. Only two of the methods of estimating in this review included specific data on water heater load. Heaters may be considered as equivalent to additional ranges, but they change the diversity and load factors and the estimating must be on a revised basis.

Use Determines Accuracy Needed

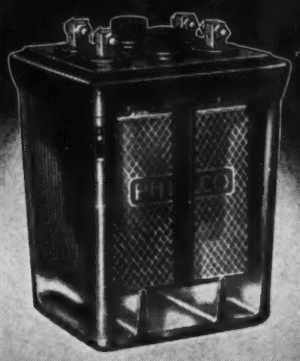
Estimates of transformer loads are used for two purposes, with considerable difference in the factors involved and the accuracy required.

1. For the purpose of selecting a transformer size for a new installation, where an answer of a 10-, 15- or 25-kva. rating rather than for fractions between is needed, approximation based on a count of the customers and of range services may be sufficient.

2. More accuracy is needed for periodic checks of transformers in service to determine where changes are necessary. Whether or not a 15-

Full Capacity a **Must**

Install a modern Philco ***Floté*** *Battery with assurance that high capacity will be maintained. Because a Philco has the most important stationary battery improvement in many years . . .* ***the Floté element that eliminates low cells*** *in full float service. To cost-minded engineers, this means that a Philco stays fully charged at lower maintenance cost . . . that a Philco delivers more years of efficient, dependable service per dollar invested. Write for specification data.*



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STORAGE BATTERIES

PHILCO CORPORATION • STORAGE BATTERY DIVISION • TRENTON 7, NEW JERSEY

Look to Locke for Distribution Materials...

This is Locke's No. 6942 angle brace—one of a complete line—used to support crossarms on heavy duty distribution circuits.

Ends are aligned accurately to lie flat along the under side of the cross arm. Holes for attachment to the cross arm are properly sized and spaced to fit predrilled arms. And, of course, *Permazinc* — Locke's *Quality Controlled* double hot-dip galvanizing — adds extra years of dependable performance.

Complete lines of distribution materials are maintained in six Locke regional warehouses and in most distributors' stocks. Call in your Locke representative.

Depend on Locke for Quality Controlled distribution materials . . . pole line hardware and insulators. One order covers both.

Locke POLE LINE HARDWARE and INSULATORS

LOCKE INSULATOR CORPORATION • BALTIMORE 3, MD.

kva. transformer in service should be changed to a 25-kva., in the example used for comparison of methods, would depend on load growth for which kw.-hr. records furnish the most reliable data for analysis.

Five of the twelve estimating procedures reviewed for this comparison are of the first type. Two of them are used with a high percentage of ranges, for which an accurate record will establish the total demand. Two additional methods modify the approximation with a classification of customers and demands based on average kw.-hr. consumptions. Five methods are fully of the second type, providing for a check of billing records in the estimating routine.

Increased Interest Noted

Spot testing with split-core current transformers and ammeters, or with tong testers, was formerly the principal method of checking loads. About two-thirds of the members reporting in a survey made by the E. E. I. Transmission and Distribution Committee in 1940 (E.E.I. Publication H-6) were using this method. It had been used by the other one-third but was being replaced by maximum demand indicators in most cases, and by estimating in others. A growing interest in estimating is evident in the number of methods published since this survey, and a recent check among another group of companies showed about one-half using demand indicators or estimating.

A summary of the factors applied in setting up the various estimating methods will be given in a subsequent issue.

•

Inexpensive 230-Kv. Sectionalizing Switch

FINDING nothing on the market in the way of an inexpensive 230-kv. disconnecting switch suitable for occasional use, the Bonneville Power Administration designed and built the switch shown. It consists of two post insulators with clips on one and a hinged copper tube, with blade on the end, on the other. A shield over the clips prevents the switch from icing up.

The switches on the tower shown are of this type. This is the Skagit

MAGIC IN GLASS

Most of America's bedroom lighting problems can be solved efficiently and in good taste—by selection from this glamorous group of Virden glass bowl fixtures.

Glass is a worthy and flexible medium for the expression of grace and refinement. It can be rich and modest in the same breath.

Functional advantages are good distribution of light; ability to live happily with any decorative scheme; ability to provide modulated color tones including French crystal; crystal; ivory and rose. Ability to remain perpetually new.

See the Virden wholesaler near you.

No. 5022—12″ Bowl—Crystal Design—Bottom Ivory, Rose or French Crystal—Ivory Holder

No. 661—12″ Bowl
French Crystal
Chromium Holder

No. 712—12″ Bowl
French Crystal or Ivory
Ivory Holder

No. 412—12″ Bowl
Crystal Trim—Ivory or Rose
Ivory Holder

No. 415—15″ Bent Glass Bowl
Crystal Design
Ivory Holder

No. 612—12″ Bowl
Sunburst Design—Clear Crystal
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For measuring resistance to earth of man-made ground connections, used with generating stations, substations, transmission towers, lightning arresters and machine frames. Grounding for protection . . . for insurance.

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- Has its own hand generator; requires no batteries or other external power supply.
- Direct-reading in ohms —"Like a voltmeter."
- No calculations required.
- Only one set of connections.
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- Self-contained, rugged and portable.
- Unaffected by the exact resistance of the reference grounds.
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- Covers a wide range of resistance—0-3 up to 0-30,000 ohms.
- Represents only a fraction of the cost of adequate grounding protection.

For a full description of the "Megger" Ground Testers, including the principle of operation, applications and how to use them, send *today* for Catalog 25-W.

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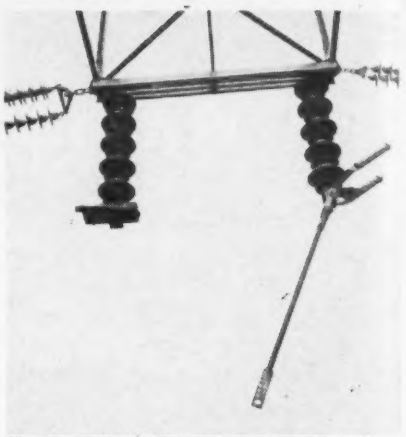
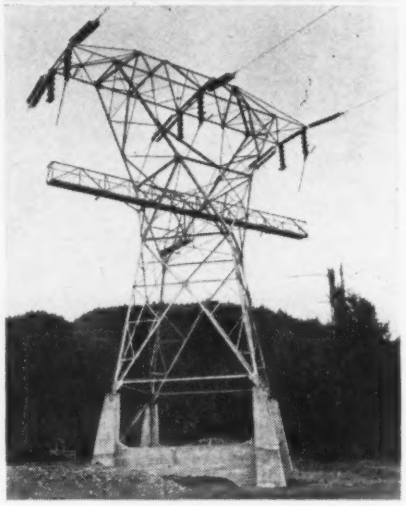


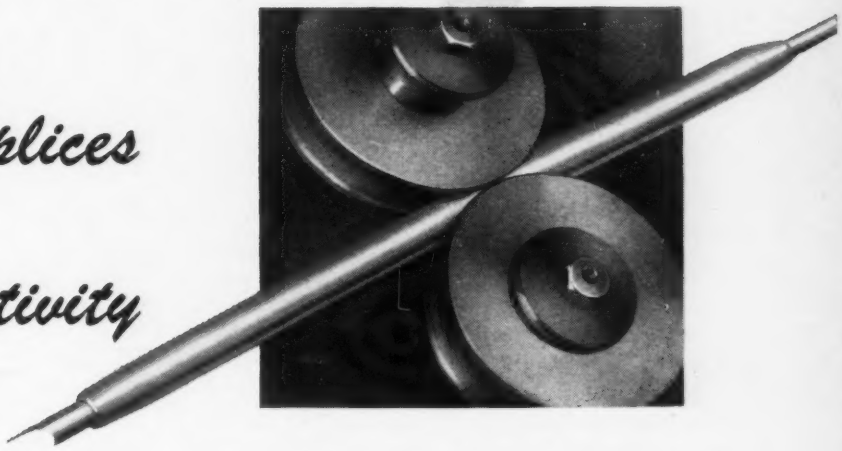


230-KV. SECTIONALIZING SWITCH (top). Post-insulator-mounted clips and blade provide inexpensive switch for opening dead line. . . . Special river crossing tower (below) showing 230-kv. disconnects and operating platform

River crossing tower on the new BPA 230-kv. line from Arlington to Blaine, Wash., where it connects with a line built by the British Columbia Electric Co. The switches make possible dead line sectionalizing for aid in locating faults.

Powerful Rolling Pressure of Kearney Splicing Machine

Assures Permanent Splices with High Conductivity

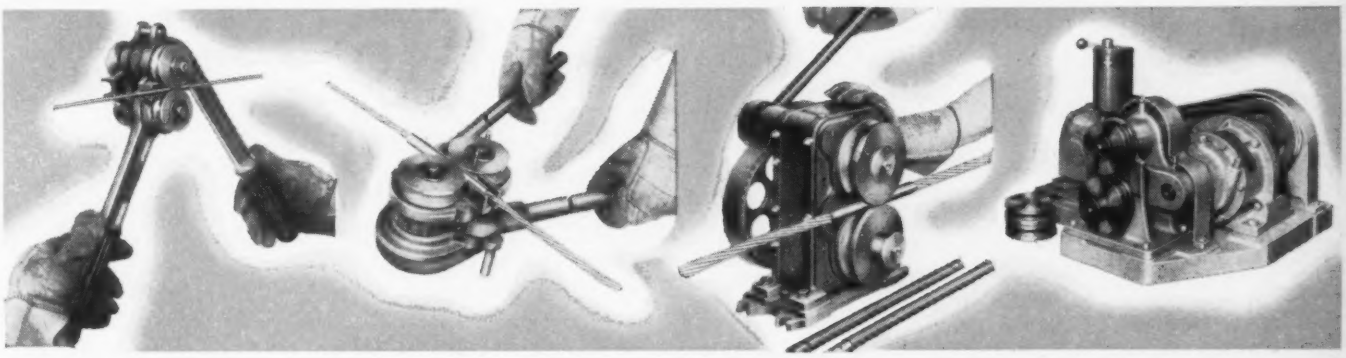


TREMENDOUS pressure developed between the rolls of Kearney Splicing Machine compresses Kearney Sleeves with such force that the splice is stronger than the conductor. Rolls of these machines are permanently set at the factory—They never need adjustments, gauges are not necessary.

To provide maximum gripping action between the conductor and the inner wall of the sleeve, Kearney Splicing Sleeves are furnished in 3 types. Each type produces the best splices on the material for which it is designed.

Small copper sleeves are bonded tightly to the conductor by the use of an abrasive compound on the inner wall. Large copper sleeves contain a coiled wire that is forced into the conductor and the sleeve wall. Aluminum sleeves are made with a threaded inner wall which produces a gripping action when compressed.

For Most Efficient Joints, Use Kearney Splicing Machines To Install Splicing Sleeves.



No. 6-3 splices sleeves from 3/16″ to 9/16″.

No. 7-2 splices sleeves from 3/16″ to ⅝″—larger and sturdier than 6-2 machine.

No. 8-2 splices sleeves from ¼″ to 1⅛″—suitable for field or shop use.

No. 9 power operated splicing machine is ideally suited to store room salvage use—¼″ to 1⅛″ sleeves.

90

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DIGESTS

Condensations and abstracts of articles in the foreign press, committee reports, unpublished papers before numerous technical societies, research bulletins, standards

Progress in Transformer Design

From a paper by Hans Hartmann (Brown Boveri) before the Conférence Internationale des Grands Réseaux Electriques, Paris, June 27-July 6, 1946.

PROGRESS in transformer construction has been characterized by improvement in insulation, facilities for transport and erection of large units, lower losses and over-all compactness. Oil is a satisfactory dielectric, but for indoor plants, because of the fire risk, transformer insulation with compressed gases, air-blast circuit breakers, and bushing or loop type current instrument transformers are being used, eliminating oil entirely.

Recent transformers utilize oil-impregnated paper barriers. A splayed flange construction (see ELECTRICAL WORLD, March 2, 1946, page 74) increases the breakdown strength and reduces the height. Radial core laminations also reduce the core length, and individual laminations can be welded together at places not traversed by magnetic flux. By placing the windings on one leg only, annular magnetic return circuits can be used. These changes almost double the rating for a given weight of material and cut the iron loss almost to half.

For extra high voltages the insulator-type potential transformer of low oil content has inner insulation consisting of a cable-like wrapper. The construction increases the metering output 50 percent while reducing the weight of materials 42 percent, of oil 27 percent, and volume 50 percent.

Infrared Lamps Dry Plastic Board

From an article in "Electrical Review," London, May 24, 1946.

PLASTIC BOARD consisting of parallel plates connected by perpendicular ribs is being produced by a British firm under the name of Holoplast. The raw material is a special paper impregnated with phenol formaldehyde resin. Tubes of this paper are formed by wrapping it on mandrels, after which they are removed, squared in a press, and assembled in parallel rows to make boards of about 4 by 8 ft.

Curing is done by suspending the boards vertically from an overhead monorail conveyor which carries them through two spraying chambers where they are coated with a plastic material and then through a drying chamber where they pass between parallel banks of infrared lamps. The conveyor line is about 125 ft. long, including 20 ft. in the drying chamber. Time of passing through this chamber may be varied from 2½ to 10 min.

There are 200 Metrovick infrared lamps in each of the two banks, the arrangement being such that the heat penetrates through the sprayed material to the board so the drying is outward. Each lamp, rated 250 watts, is mounted in a gold-plated reflector.

Performance of 115-Kv. Wood Pole Line

From a paper by G. E. Tennant before the Edison Electric Institute, Virginia Beach, Va., October 7, 1946.

SELECTION of a wood H-frame pole line for a 13.3-mi. extension to a 115-kv. transmission line of the Central New York Power Corp. was made to determine the effect of lightning on this construction as compared with steel towers. The conductors were 336,400-cir.mil ACSR suspended by six 10-in. disc insulators from 20-ft. horizontal fir planks at the top of the two 50-ft. poles set on 10-ft. centers, and cross-braced with a Hubbard wood assembly.

Before the line was energized in 1937 lightning caused trouble, which was repeated in the next two summers. Ground resistance was high, averaging 75 ohms per structure. In the winter of 1939-40 a ⅞-in. steel cable was erected 8 ft. above the cross member and over one pole of the H-frame. In 1940 a No. 2 stranded copper counterpoise was buried along the route. The cost of protection was $1,780 per mile.

Up to 1946 no interruptions occurred. On July 27 the perfect record was broken by a 4-sec. interruption from an undisclosed cause and with no storm in the area. The 10-year record indicates that the impulse strength of wood structures alone at 115 kv. is not sufficient to maintain satisfactory service against lightning, but that the grounding is efficient. The same basic design has since been used on all lines with a close to perfect operating record.

German Mechanical Rectifier

From a paper by Otto Jensen (I-T-E Circuit Breaker Co.) before the Electrochemical Society, Toronto, October 16-19, 1946.

IN 1940 a rectifying device known as the contact converter, developed by Siemens-Schuckert of Berlin, made its appearance. Difficulties were encountered, but by 1943 it was possible to build a successful machine delivering 10,000 amp. at 400 volts d.c. and 5,000 amp. at 800 volts d.c. The total of installations was 111,000 amp. at 400 volts.

The device comprises a mechanism synchronously driven and adjusted to make metallic contact between the a.c. source and the d.c. load at proper time intervals. To prevent arcing at the contact a choke coil opposes the build-up of the load current. Its iron core must have a sharp magnetizing knee, so a 4 percent silicon iron or nickel iron is used.

Efficiency is high as compared with other conversion equipment, particularly at lower voltages, approaching 99 percent. It is smaller and lighter, and absence of auxiliary equipment should be advantageous. German operating experience indicates its reliability.

During the Russian occupation of Berlin all machines were removed, together with drawings and specifications, so that information in this country is meager. If the American electrochemical industry is interested, apparently an American manufacturer will have to make an independent development.

Do you have a turbine lubrication problem?

Gulfcrest WCR, the world's finest turbine oil, is the answer!

_too frequent oil changes or too much make-up?

_rust due to condensation?

_steadily increasing neutralization number?

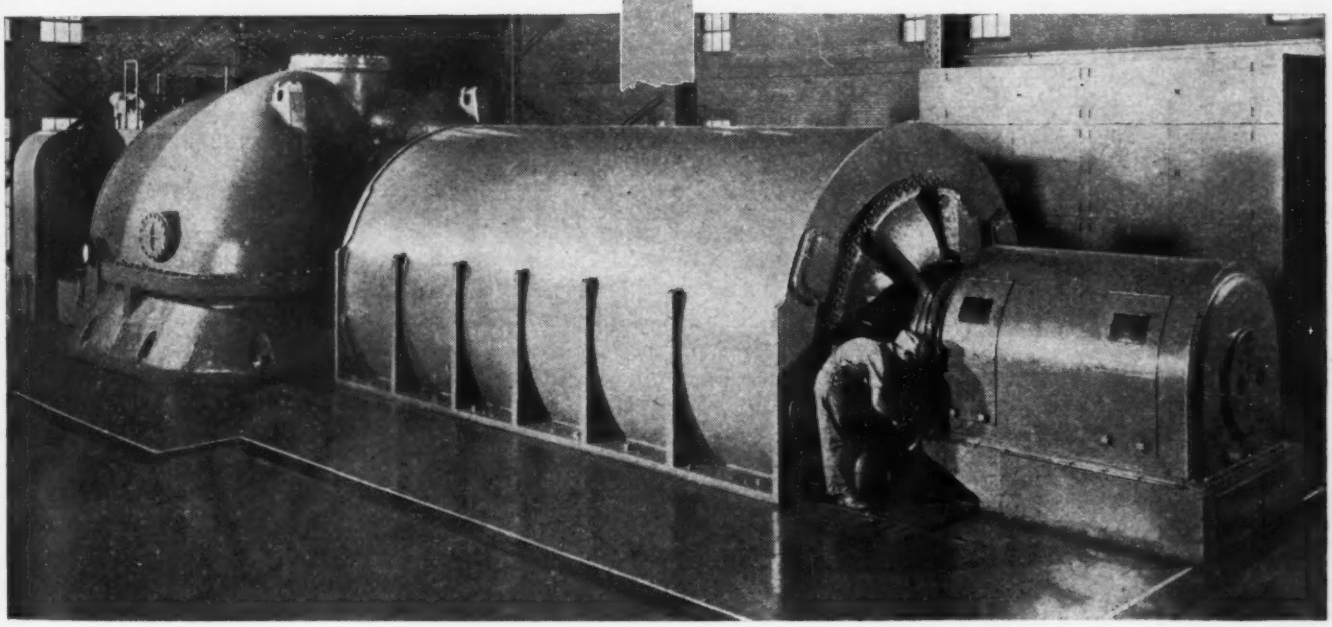
_oil foaming?

_lasts indefinitely

_contains an effective anti-corrosion inhibitor

_maintains a remarkably low neutralization number

_is nonfoaming



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Call in a Gulf Lubrication Engineer today and ask him to recommend the proper grade of this superior oil to provide the best lubrication for your turbine. Write, wire, or phone your nearest Gulf office.

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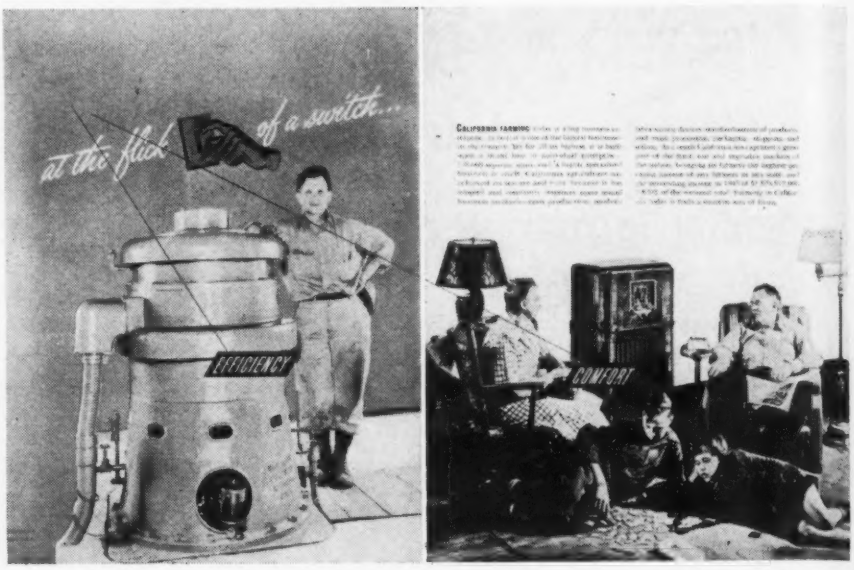
LOAD BUILDING

California C.R.E.A. States Its Case

OF CALIFORNIA FARMS, 96.3 percent are electrified. The average annual electricity use on farms of the state is 14,440 kw.-hr., more than 7 times the national average. These figures are a large part of the reason why California farmers have the highest per capita income of any state. So says a handsome booklet recently published by the California Committee on the Relations of Electricity to Agriculture. Power companies are now distributing 100,000 copies of this booklet.

Well-written text and numerous illustrations tell and show how farm electrification was pioneered in California, and how in its many ways it increases farmers' profits and lightens their work. For instance, back in 1912 the Pacific Gas & Electric Co. fitted up a railway car with demonstrations of farm electric applications which were looked over by tens of thousands of farmers as it toured the company's service territory. The earliest and still the largest use of electricity on California farms is for irrigation pumping. By 1920 about one-third of the state's farms had electric service, electrically pumped water irrigated nearly 1,500,000 acres, and the state had the record of highest per capita use of electricity in the world. Today, electricity is applied effectively and profitably to every kind of agricultural production in the state, from frost prevention in citrus groves to debeaking poultry.



WHAT electricity means to the state's farmers is told in booklet distributed by California power companies

This accomplishment resulted from the work of power companies in close cooperation with farm organizations, state regulatory bodies, electrical goods suppliers, and of prime importance, the University of California College of Agriculture. The California C.R.E.A. came into being in 1924 as a part of a national movement in rural electrification and although the parent organization is long since defunct, its California branch has continued vigorous and lusty in highly productive activity.

• • •

Mercury Street Lighting Offers Economies

OF LATE YEARS there has been considerable discussion about the use of mercury lamps for street lighting. There is nothing novel about this, said A. F. Dickerson, manager, lighting division, General Electric Co., in a paper presented at a recent meeting of the Southeastern Electric Exchange. There were upwards of 20,000 mercury street lamps in use in England before the war and scores of big installations on the European continent. In this country about twenty-five cities now successfully use mercury lamps for street lighting. The largest installation is in Denver where about 1,200 mercury luminaires light most of the business streets.

Operating Comparisons Incandescent and Mercury Street Lighting

	Incandescent 15,000 L.	*Mercury* F-H1	E-H1
Lumens (Average to 70% Life)..	13,800	13,600	15,600
Watts (With ballasts)	715	450	450
Life Rating (Hours)	2,000	6,000	3,000
Lamp Costs (35% Discount)	$3.32	$4.58	$14.70
Replacement Costs @ $1 each.....	2.00	0.67	1.34
Energy @ 1¢ per kw-hr.....	30.60	18.00	18.00
Yearly Replacement and Energy per Lamp*..	$35.92	$23.25	$34.04

* Does not include amortization of investment, taxes, and other items in rate structure.

Practically all of the lamps in the systems both abroad and in this country are similar to the 400-watt, 16,000-lumen lamp that is so successfully used in industrial lighting. Most luminaires employ vertically mounted lamps although there are several thousand luminaires in England using horizontal lamps. In these latter, a blow magnet above the lamp prevents the arc from arching and destroying the enclosing glass tube.

Recently a new 400-watt lamp of

1.

THREE A'S OF STORE LIGHTING—You've heard about it—G-E's quick reference handbook that's packed with useful information on sales lighting layouts, brand-new lighting equipment designs and a wealth of lamp and installation data. Use it as your practical guide to more lighting business.

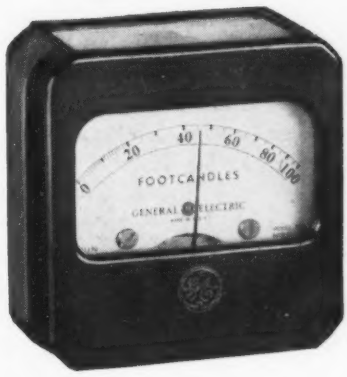
2.

G-E FOOTCANDLE SELECTOR—You don't need to be a lighting engineer to recommend proper illumination levels for lighting jobs in factories, offices, stores, schools and homes. Just a flick of the pointer on this G-E Selector tells you the right number of footcandles for the types of jobs you encounter most frequently.

4 steps to bigger lamp profits

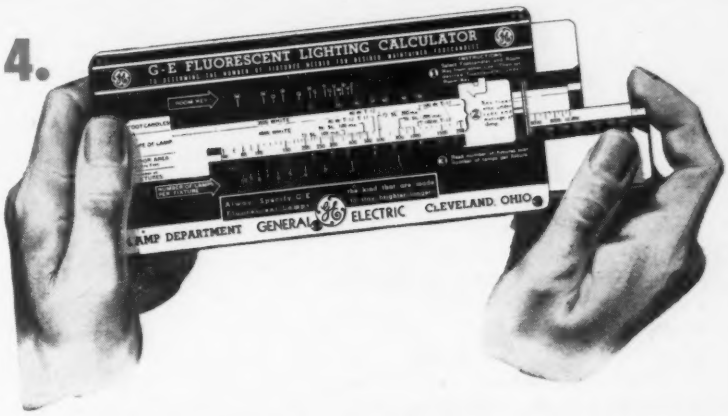
GENERAL ELECTRIC OFFERS FOUR BASIC TOOLS TO HELP YOU MERCHANDISE "PLANNED LIGHTING"

3.



G-E LIGHT METER—A simple, convenient, low-cost instrument for dozens of practical jobs. Use it to demonstrate both the need for and the results of modern lighting. Vest pocket size—only $2\frac{1}{4}$" square by $1\frac{1}{8}$" thick. Has a full scale reading of 100 footcandles.

4.



G-E FLUORESCENT LIGHTING CALCULATOR—It's easy as 1-2-3 to deliver an accurate lighting specification with this handy pocket size slide rule. Once you decide on the amount of light and type of fixtures, it tells you instantly how many fixtures and how many G-E fluorescent lamps you'll need.

FOR FULL INFORMATION on these and other valuable General Electric "Planned Lighting" tools, call your nearby G-E Lamp office today!

G-E LAMPS

GENERAL ELECTRIC

Linemen are Kleinmen because they know that their very safety depends on the quality of the equipment they use. Klein has been their standard "since 1857."

***KLEIN CLIMBERS** assure safe trips up and down the pole. They do not cut out.*

***"KLEIN-KORD" RED CENTER SAFETY STRAPS** provide maximum safety—the Red Center unmistakably signals when the strap should be replaced.*

***"KLEIN-KORD" TOOL BELTS** give the safety, comfort and convenience needed for fast, efficient work.*

***KLEIN PLIERS** with their proper balance, sharp knives and matched jaws help in doing any wiring job better, quicker.*

Be sure to equip your linemen with Klein Pliers and equipment. Your supplier will fill your order as rapidly as possible.

Ask Your Supplier

Foreign Distributor: **International Standard Electric Corp., New York**

The Klein Pocket Tool Guide showing the Klein line and containing useful tool information will be sent on request.

Since 1857

Mathias KLEIN & Sons

Established 1857 — **Chicago, Ill., U.S.A.**

5200 BELMONT AVENUE, CHICAGO 18, ILLINOIS

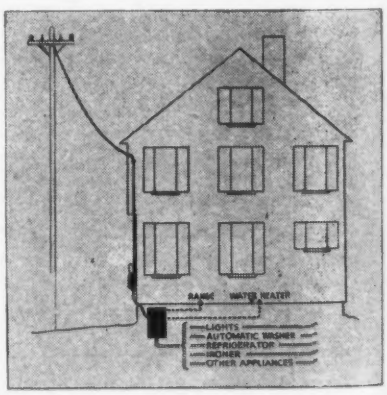
20,000 lumens has been introduced. Due to its expensive quartz tube construction and relative short life it is questionable whether its use can be now justified as can be seen from the accompanying table of operating costs.

The advantages of mercury street lighting with the F-H1 lamp are high efficiency and very low maintenance expense. The mercury lamp, like all arcs, possesses a sparkle and brilliancy which are desirable assets for business street lighting. The main objection to mercury lighting is its yellow green color. This is largely corrected on business streets by warm light from show windows and from neon and incandescent signs. Even when these sources were turned out during the war there was no objection to the color of the mercury lighting on the streets of Denver. Very definitely mercury street lighting—particularly on business streets and on many of our proposed freeways—will greatly expand in the next few years.

•

Promote Residential Load

FREE SERVICE entrances for residences under certain limitations up to and including a 100-amp. service have been established by the Central Maine Power Co., in order to provide sufficient wiring and capacity for the use of electric ranges, electric water heaters or other additional appliances. The policy applies to new homes and farms as well as to existing residential property where the



FREE service entrance provided by Central Main Power extends from pole to service switch on customer's premises. User furnishes range, water heater or other circuits inside building, but if desired the company will arrange for installation of heavy duty (range and water heater) circuits at a flat price

He pulls production DOWN!

INADEQUATE WIRING, the industrial jinx, upsets the best of calculations—the most thorough planning.

Production quotas are a fiction, the most modern machines are inefficient, the best of workmen are frustrated when overtaxed, over-extended obsolete wiring can pull down plant efficiency 25 percent* or more.

To get the production curve up, ask your plant power engineer, your consulting engineer, electrical contractor or utility power salesman to put this demon out. Action now may save shutdowns and costly alterations later.

47456

*WIRE AHEAD, a new booklet discussing preventive maintenance . . . the symptoms of inadequate wiring . . . and presenting plans for anticipating electrical demand, is now in preparation. We shall be glad to send it on request as soon as it is available. Address our Advertising Department, 25 Broadway, New York 4, N.Y.

ANACONDA
from mine to consumer

ANACONDA WIRE AND CABLE COMPANY

Now CRESCENT
Aluminum Building Wire

An Excellent Alternate for Copper
COSTS LESS!
PROMPT SHIPMENT!
Aluminum feeders, particularly in the larger sizes show a substantial saving in cost per ampere of useful circuit capacity in most cases as compared with copper. CRESCENT Aluminum Building Wire is made with ENDURITE heat resistant insulation in sizes number 4 AWG to 1,000,000 C. M. as Type RH - 75°C - 600 Volts. Send for Bulletin 471 for complete information.
CRESCENT
WIRE AND CABLE
NEMA
CRESCENT INSULATED WIRE & CABLE CO.
TRENTON, N. J.

addition of new equipment makes the present wiring inadequate, and is designed to meet all but unusual cases. Fuses are not included, and the facilities furnished by the company apply to 3-wire, 120/240-volt, single-phase construction. The company furnishes, installs, owns and maintains these service entrances. The customer is responsible for all excavation, backfill and conduits when required on private property. It is estimated that the new policy will save customers about $200,000 a year in wiring costs. All wiring will be done by local contractors under a cooperative plan with the company.

Services must be continuously connected to the source of supply in order to qualify for the company's offer, and a signed application for service entrance with written permission for the installation is required by the utility.

Range and Water Heater Circuits

Circuits from the customer's entrance switch to a range or water heater are not a part of the company's property; but if the customer desires, the company furnishes the range circuit at a flat rate of $20 or water heater circuit at a flat rate of $15 in single family dwellings. When requested in multiple family dwellings the company likewise furnishes the respective circuit for either range or water heater at the same flat prices for each.

Water heater off-peak control assembly when required will be furnished and installed by the power company without charge.

New Policy for Farm Customers

In cases where a single customer has electric service in more than one building (barn, dairy, garage, hennery, shed, etc.) but uses a single meter, the company, in order to provide the most satisfactory service, will install one service connection equipment at one point and install a "yard" or central pole, where advisable, without charge. In announcing the new free service entrance policy the company points out that farm and home owners and tenants are going "all-electric" for the same reason that housewives buy apples by the peck or bushel rather than singly: because they thus save money. Recent rate schedules of the company are designed to encourage large use of energy, viz., $1 for the first 14 kw.-hr., 5 cents

PAPER

"at work" in many* new ways!

*In telephones, for instance

In many essential products MOSINEE papers are replacing various other materials in essential products, as designers take advantage of modern technological advances offered through use of MOSINEE. Today, the benefits of many new uses of MOSINEE can be multiplied for peacetime progress, by working together, like Americans, to make the most of opportunities... for the good of everyone!

• • •

* *Modern industrial papers, custom-made to meet specific requirements, with characteristics scientifically controlled in the MOSINEE manner, have become essentials as product parts or materials. Paper technicians of MOSINEE are qualified to help many industries make the most of special custom-made papers.*

MOSINEE PAPER MILLS COMPANY

MOSINEE • WISCONSIN

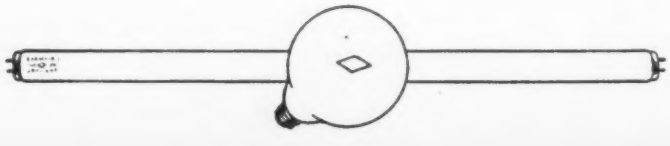
Essential Paper Makers

Please address your letter to "Attention Dept. B"

Let CHAMPION Experts INVESTIGATE!

Champion's lighting engineers are interested only in helping you to get better lighting and thereby increase your production efficiency, safety, working morale and lighting economy. Their unbiased recommendations are freely available to every user of Champion **Fluorescent** and *Incandescent* Lamps.

Whatever your lighting problem, large or small, you will find it profitable to take advantage of the Champion combination of lamps of fine quality and lasting dependability, supplied by a competent local distributor who knows industrial service needs and backed by competent lighting engineering counsel.



CHAMPION LAMP WORKS

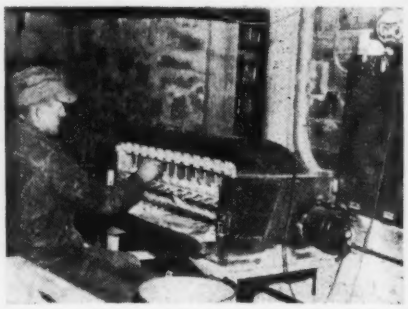
Lynn, Massachusetts

A DIVISION OF CONSOLIDATED ELECTRIC LAMP CO

per kw.-hr. from 14 to 65, 2 cents for over 65 and lower if an approved type of storage water heater is used.

•

Electric Egg Cleaner Cuts Labor In Two



Photo—H. V. Rickner

MOTOR-DRIVEN machine cleans a dozen eggs at one time

INSTALLATION of an electrically operated egg cleaner has released one person for other work at the poultry farm of William Geil in Penfield, N. Y. The removal of each egg from the basket, wiping and polishing it by hand and placing it in a crate is a tedious, long drawn-out process. For the busy poultryman the hand cleaning process requires too much time.

12 Eggs at a Time

In the machine, driven by a ¼-hp. motor, twelve eggs are placed in a row and each egg is cleaned by small rings of abrasive cloth (such as emery cloth) which are loosely attached to a rapidly revolving cylinder. The eggs rotate slowly so that all sides are subjected to the gentle action of the abrasive rings. By the time the twelfth egg is placed in the row, the first is usually cleaned and ready to be removed. Some eggs may require a longer time for cleaning than others, in which case they are not removed from the machine until the cleaning is complete. By this continuous process one person can do the job which formerly required two persons and can do it in less time.

An improvement has been made for the installation. Dust is carried from the rear of the machine through a metal duct to the outside of the building. This dust removal system has a small exhaust fan driven by a 1/60-hp. motor. Power for the Geil farm is supplied by the rural lines of the Rochester Gas & Electric Co.

You Need the EXTRA MARGIN of SAFETY You Get with Macallen Mica

Let's get to the bottom of

THE FALSE BOTTOM!

Some things are built with a false bottom like the glass above, and deceive you into thinking you're getting more than you are. Substitutes for mica, too, sometimes *appear* to offer many of the unique advantages of mica. But don't be misled! Wherever insulation is important, beware of the false bottom every time. Because there is no substitute for mica; no substitute, either, for the experience, the resources and the service that are exclusive with Macallen Mica.

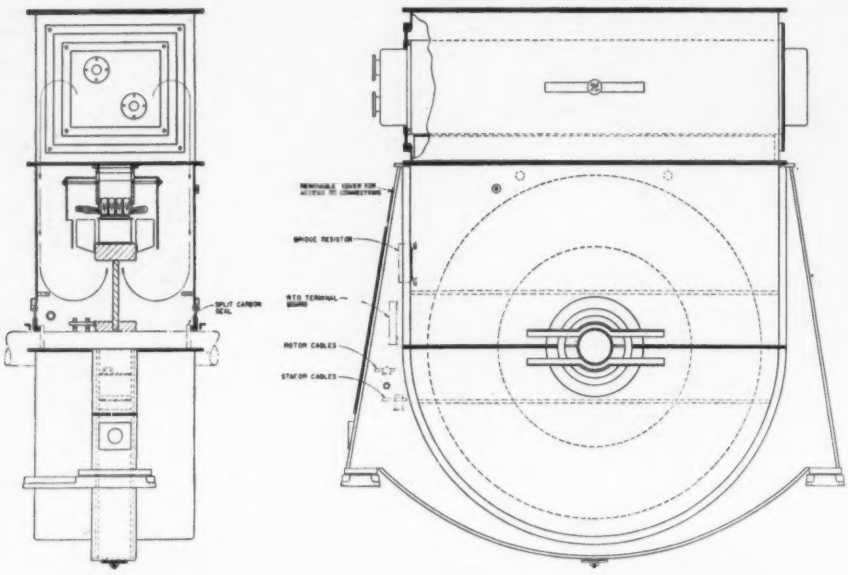
MACALLEN *Mica*

THE MACALLEN COMPANY, BOSTON 27, MASS.

CHICAGO: 565 W. Washington Blvd. CLEVELAND: 1231 Superior Ave.

NEW EQUIPMENT

Inert-Gas-Filled Motors Designed for Hazardous Areas



Two 300-HP., 240-rpm., inert-gas-filled synchronous motors, now being built by the General Electric Co., are designed for use in an inflammable atmosphere. The enclosure has built-in coolers and a sealed chamber which is filled with a noncombustible gas, under pressure.

By removing one access cover, the field leads, stator leads, terminal boards, and bridge resistors for the temperature relay are within reach. Bumpy terminal boxes, which mar the external lines of previous designs, have been eliminated.

The inert gas follows unrestricted flow lines in the cooler, which is located over the motor, to give the necessary heat transfer. The cooler can be removed for inspection or maintenance.

Resistance temperature detectors are imbedded in the stator windings. They are used with a temperature relay to remove the motor from the line if cooling-water supply fails, or if the temperature of the stator windings becomes excessive for other reasons.

• • •

Electrical Alarm System Detects and Locates Fire

AN ELECTRICAL alarm system, which warns of a fire and indicates its location, has been announced by Lord-Taber Co., Inc., Canandaigua, N. Y. It will also indicate a drop in temperature, thus forewarn of pipe freezing hazards.

The device, called Detectomaster, is made up of a control unit which is fed by up to 15 remotely placed thermostats, and a horn. In the event of a temperature fluctuation, the thermostat opens the circuit, and sounds the "Klaxonette." At the same time the green safety signal goes out, the red danger light goes on, and an indicator on the panel board points to the location of the thermostat indicating an abnormality.

The unit is battery fed. It utilizes normally closed silver contacts. Thermostats are pre-set at the factory for 20 to 200 deg. F. The entire working assembly is reported to be resistant to corrosion, fungi, etc.

•

Refrigeration Mechanism Weight Cut 50 Percent

A ROTARY refrigeration mechanism for commercial and industrial applications is being introduced by Frigidaire Division, General Motors Corp., Dayton 1, Ohio. Contained in a small compact package and weighing about 85 lb., the new unit consists of a rotary compressor and motor assembly housed in a single, steel, cylinder-shaped case. It is reported to be 25 to 50 percent lighter than comparable reciprocating models.

The compressor has two moving parts —the impellor and divider block. It is direct connected to the electric motor. The refrigerant condenser is mounted on a doughnut-shaped liquid refrigerant receiver, which wraps around the assembly. A small horizontal electric fan, mounted on the top and concealed by a grille, cools the unit. The mechanism is sealed and self-oiling.

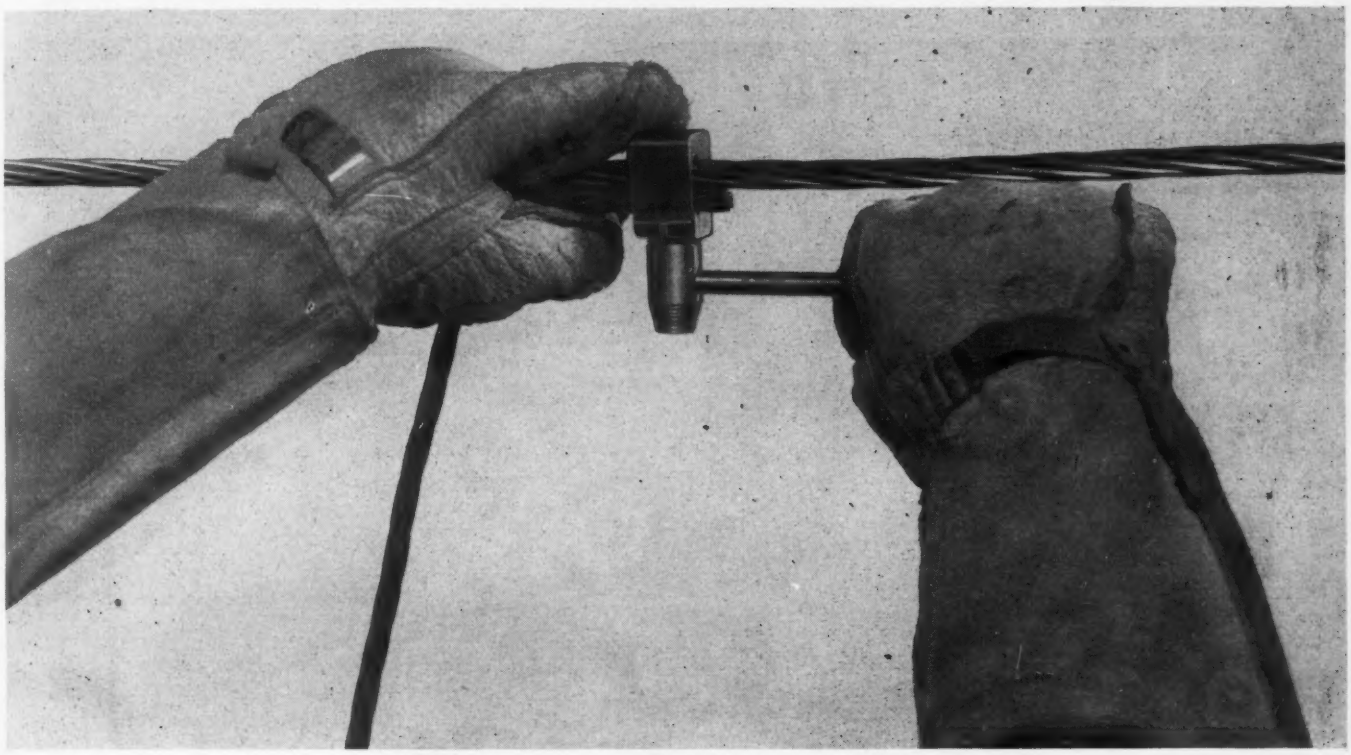
•

Plastic Coating Protects Equipment Surfaces

A WATER-THIN, crystal-clear liquid, which is stated to be impervious to heat, cold, moisture and caustic soaps, has been announced by Reyam Plastic Products Co., 1525 East 53rd St., Chicago 15, Ill. It is reported to protect

Easy to handle...

even with gloves!



Fargo Connectors

ENGINEERS' VIEWPOINT—

The vise type connector is electrically durable. Component parts weather better than copper. On small sizes, total jaw pressure exceeds a half ton—on larger sizes well over a ton. Vibration is no problem with Fargo's vise action.

These characteristics together with timesaving and reusability features all add up to a good, low cost and durable connection.

LINEMEN'S VIEWPOINT—

Linemen often work under handicaps—bad weather—awkward position on poles—close to high voltages and with heavy rubber gloves with protectors. With no threading of parts on a vise type connector, their work, risky at best, is much easier and safer.

They save disposition too, as well as time!

"--- grips like a vise."

FARGO MFG. COMPANY, Inc.
ESTABLISHED 1914
Poughkeepsie, N. Y.

Full Fargo Line Distributed by
LINE MATERIAL COMPANY
Milwaukee, Wisconsin.
(Representatives in principal cities)

For

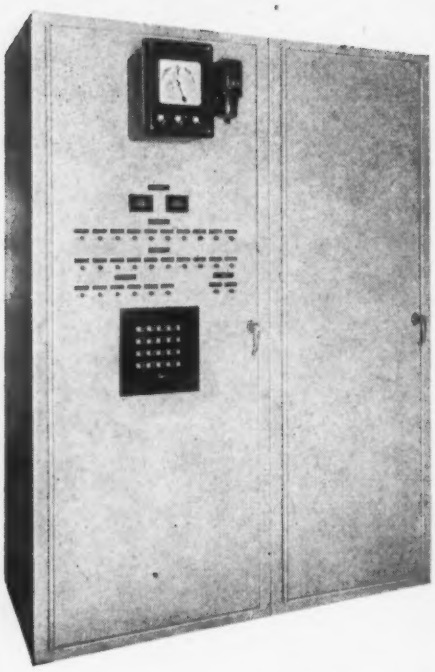
MODERN AUTOMATIC

or

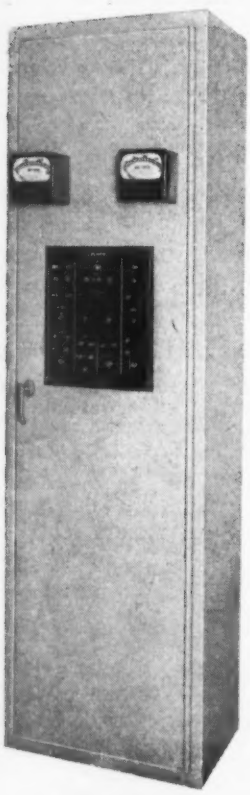
REMOTE HYDRO PLANT CONTROL

Call on

CONTROL CORPORATION



As the leading manufacturer of supervisory control equipment, Control Corporation is also able to supply modern hydro plant control, either automatic or remote. Each installation is custom engineered to meet the specific requirements of a customer and to operate satisfactorily under the conditions existing at the point of installation.



Equipment can be supplied for either small generator plants or large multi unit plants. Control can be entirely automatic or can be placed under the direction of a remote operator who will not only have control discretion but will also have available complete information concerning the condition of the remote plant.

Call on Control Corporation engineers for information relative to the operating economies that can be achieved by Control Corporation hydro plant control equipment.

CONTROL CORPORATION

718 CENTRAL AVE., MINNEAPOLIS, MINN.

the finish on painted machinery and equipment, varnished floors, etc.

It is applied to clean surfaces with a cloth. Once applied, the manufacturer reports that surfaces can be kept clean with a damp cloth. It is stated to resist alcohol, alkalis, and most chemicals. It becomes touch dry in 10 minutes and hard dry in six hours, the manufacturer reports.

•

Strap-on Thermostat Made in Three Types

A NEW strap-on thermostat which is designed especially for controlling water, steam, chemical, etc., tempera-

tures within a differential of 15 degrees has been introduced by United Electric Controls Co., 69-71 A St., Boston 27, Mass. The bimetal thermal assembly is actuated by heat transferred from the rear of the housing.

It is known as type "S," has a dial adjustment calibrated from 40 to 210 deg., has a voltage rating of 110 to 220 a.c., and a wattage rating of 1,200 on resistance load and 300 on induction load. It is reported as suitable for pilot duty operation.

Adjustable clamps allow mounting on a wide variety of pipe diameter. The housing is tapped, ready to receive standard electrical connections. Three types of switch action are available; normally closed, makes on falling temperature; normally open, breaks on falling temperature; and double throw, one side normally closed, one side normally open, no neutral position.

•

Wire Identification Made By Fiberglas Yarn

DYED Fiberglas yarns, for use as identification yarns for electric wires and cables, are now being produced in nine colors by the Owens-Corning Fiberglas Corp., Toledo 1, Ohio. Made in blue, orange, green, yellow, black, brown, slate, red and purple, the color film is stated to represent 1 to 2 percent of the finished product.

The yarns, reported as resistant to heat, moisture and fungi, are used as marker yarns which identify manufac-

It's NOT the HEAT nor the HUMIDITY

IT'S THE INSULATION that counts in hot-spot wiring

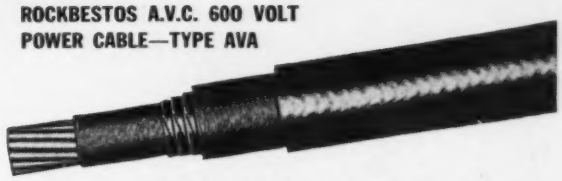
100° in the shade is a cold-wave compared to the baking heat of boilers, steam lines and ash pits. Add rotting fumes and your circuits are building up trouble unless the wire is made to take it — with Rockbestos A.V.C., the *permanent insulation*.

Failure-creating heating and cooling cycles in ducts or conduit runs won't present any problems either, if they are wired with Rockbestos A.V.C. wires and cables. Their felted asbestos insulation, impregnated with heat, flame and moisture resisting compounds, withstands temperatures up to 230° F. and condensation without baking brittle, drying out, cracking, flowing or failing. And you get extras in protection from swelling, rotting or burning if circuits are exposed to fumes, oil, grease or flame.

The two Rockbestos constructions pictured are among 125 standard types — including Switchboard Wires, Multi-conductor Power Cables, Secondary Network and Fireproof Vault Cable and Rockbestos All-Asbestos Wires and Cables. Write for a catalog.

ROCKBESTOS PRODUCTS CORPORATION
212 Nicoll St., New Haven 4, Conn.

ROCKBESTOS A.V.C. 600 VOLT POWER CABLE—TYPE AVA



For power and lighting circuits installed in conduit or exposed to high ambient temperatures and condensation. Impregnated asbestos insulation and braid won't bake dry, flow or de-center under operating temperatures up to 230° F., and won't rot or bloom when exposed to corrosive fumes, oil or grease. Sizes No. 18 AWG to 2,000 MCM. Similarly insulated cables up to 5,000 volt rating, plain, lead-sheathed or armored, in single and multi-conductor construction.

ROCKBESTOS A.V.C. 600 VOLT CONTROL CABLE

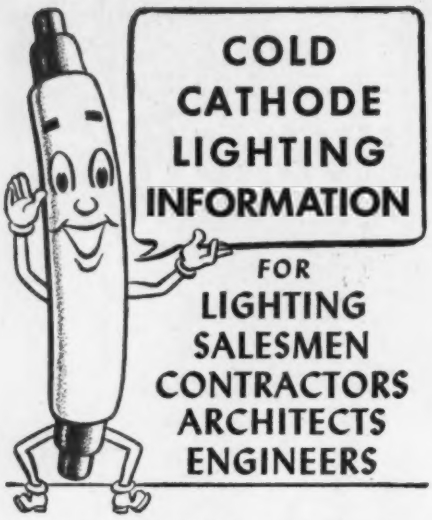
Designed for use under conditions too severe for control cables with other types of insulation which deteriorate rapidly when exposed to high temperatures. It will operate successfully under the attack of heat, oil, grease or corrosive fumes, will not burn, and is suitable for installation either open or in conduit as it has ample moisture resistance. In one to 19 conductors, standard stranding AWG No. 9—19/#22 and No. 12—19/#25. Other strandings available to customer's specification.

125 different wires, cables and cords have been developed by Rockbestos to meet severe or unusual operating conditions.

ROCKBESTOS A.V.C.

The Wire with Permanent Insulation

NEW YORK BUFFALO CLEVELAND DETROIT
CHICAGO ST. LOUIS LOS ANGELES PITTSBURGH
SAN FRANCISCO SEATTLE PORTLAND, ORE.



Let this technical data and printed material help you to specify and sell *Better and More Dependable* lighting installations.

For commercial or industrial installations

***COLOVOLT**

Cold Cathode Low Voltage Lighting offers these extra advantages

- Longer lamp life... one year guaranteed
- Lower maintenance cost per foot candle of light
- Minimum interruption of important production jobs
- Instantaneous starting without troublesome starters
- Engineered for individual or line lighting

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Architectural and Engineering Files for 1947

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GENERAL LUMINESCENT CORP.

660 S. FEDERAL STREET • CHICAGO 5, ILLINOIS

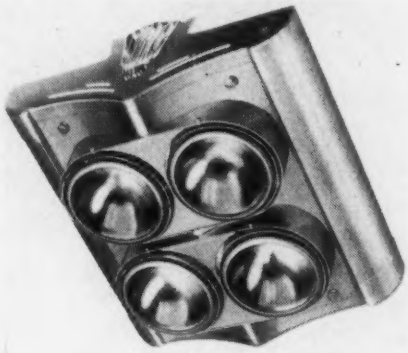
turers of cable produced according to Underwriters' Laboratories standards. The manufacturer reports that the strength of glass makes it possible to use a fine yarn and thereby hold down manufacturing costs.

Dyed Fiberglas yarns are also made in braided cable covering for use as circuit tracers. In this application the yarns are braided over the primary insulation in combination with white yarns, or solid colors, to form the color codes. The dyed yarns are reported to be resistant to solvents normally used in applying the lacquer coatings on the wires.

• • •

Incandescent Spot or Flood Added to Fluorescent

TWO NEW UNITS have been developed by Lighting Products, Inc., Highland Park, Ill., for adding incandescent spot or flood lighting to fluorescent installations. The units accommodate two or four 150-watt, PAR 38 lamps. Basic chassis of each unit is designed to blend with the company's four-light Constellation fixtures.



In the new Spot-O-Lites, each lamp has 360-deg. swivel and 35-deg. angle of projection, and can be focused independently of the other lamps in the unit. The fixtures are fabricated of 20-gage steel, and finished in aluminum baked enamel. The bottom side of the housing is completely enclosed. Ventilation is gained through the top of the housing. Units may be surface or stem mounted and can be used individually or between sections of continuous runs of the previously mentioned fluorescent units.

• • •

Life-Test Rack Has Range from 90 to 600 Volts

A NEW Life-Test Rack for incandescent lamps has been developed by Eisler Engineering Co., Inc., Newark 3, N. J. It consists of a steel frame with four parallel racks into which the lamps to be tested are inserted. These racks can be tilted so that the lamps may be tested in any position from vertical through 180 deg., upside down. The unit is connected to 220-volt, 60-cycle, single-phase power supply. A voltage stabilizer is used to compensate for fluctuation in the supply.

The two upper racks are for testing 230-volt lamps, the two lower, for 120-volt lamps. Within these two groups, the upper rack is wired for the accelerated 5-hour test and the lower, for the 200-hour life test.

Two tap switches are provided for each rack, one for coarse and the other for fine adjustment of the voltage of the particular rack. A multirange voltmeter supplied with two tap switches is so connected that the voltage on each rack can be checked. Each lamp is individually fused. Range for testing is 90 to 600 volts.

• • •

Seamless Molybdenum Tubing Produced in Quantities

DEVELOPMENT and production of a line of seamless molybdenum tubing in commercial quantities was announced recently by Callite Tungsten Corp., Union City, N. J. Available immediately on a production basis, the tubing is now being made in sizes ranging from 0.040 to 0.500 in. outside diameter and in lengths up to 9 in. Other diameters may be available as specials.

Moly tubing can be machined, worked and shaped within reasonable tolerances, and can be welded to iron, nickel and similar materials, the company reports. It is not affected by hydrofluoric acid, potassium or sodium hydroxide, and only slightly by nitrogen, it is stated.

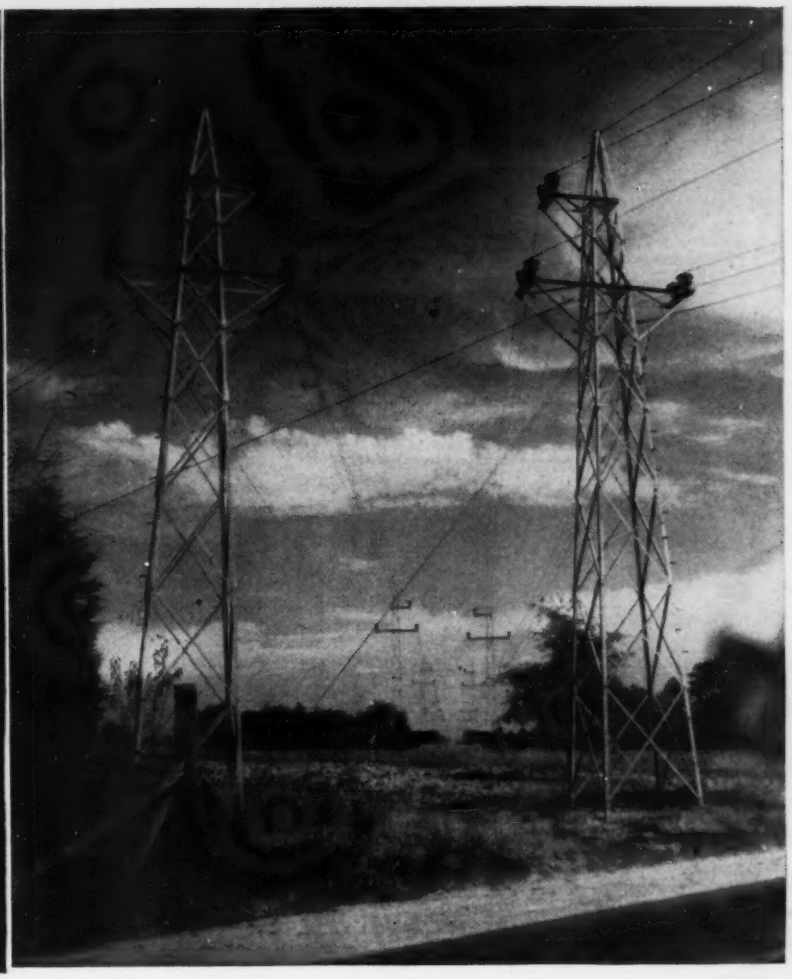
•

New Small Motors Have Large Bearing Surface

A NEW 1/20-hp., 4-pole shaded pole, totally enclosed a.c. motor, designed for continuous duty at 1,500 rpm., is being introduced by the Redmond Co., Inc., Owosso, Mich. Sold under the tradename MocroMotors, these new units

For Real Economy in Weed Control—

SPRAY 'EM TO DEATH!



Hard, cold figures can't be denied! Take a good long look at the cost per acre—the cost per mile—or the cost per year. Figure it in man-hours saved or in results achieved . . .

No matter how you add it up, the experience of maintenance departments everywhere indicates that you'll always come out with the same answer: *The chemical way is the economical way to control weeds.*

Get the facts—satisfy yourself. See your qualified sources—or write today for literature.

Cut maintenance costs with— DOW WEED KILLERS

2-4 Dow Weed Killer

Low cost. Highly recommended for killing broad-leaved weeds in lawns, to beautify parks, streets, and company buildings. Available both as a liquid and a powder.

Esteron 44—a powerful 2, 4-D Weed Killer

Especially useful against many types of woody plants, such as wild rose, poison ivy, mesquite and sprouts of many other woody species. Ideal for use on cut-over land and along right of ways.

Dow Contact Weed Killer

"Chemical Mower" for weeds along canals, ditch banks, fences and roads. Kills most annuals completely. Destroys all weeds and grass above ground, leaves roots to prevent soil erosion.

The Dow Chemical Company has recently completed a 16 mm. sound movie in color, titled "Death to Weeds", containing scenes from actual field applications of Dow weed killers. This movie may be obtained for public showing by application to the Advertising Department, The Dow Chemical Company, Midland, Michigan.

50th Anniversary, 1897-1947

DOW

CHEMICALS INDISPENSABLE TO INDUSTRY AND AGRICULTURE

AGRICULTURAL CHEMICAL DIVISION

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

New York • Boston • Philadelphia • Washington • Cleveland • Detroit • Chicago • St. Louis
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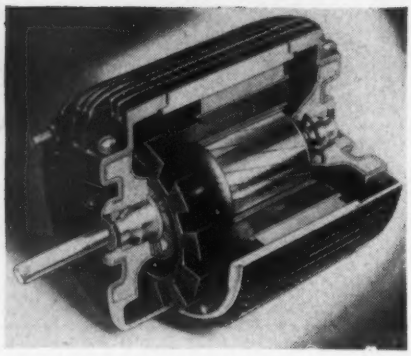


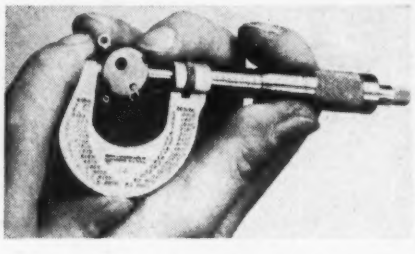
have 2 sq. in. of bearing surfaces with individually fitted bearings, spaced 5 in. over-all and 6 cu. in. total volume in oil reservoirs.

Circulating lubrication is said to permit continuous operation in any position for unlimited periods. Other features include lubricated silent thrust washers; patented flush-weld precision skewed rotor; humidity and oil resistant windings; controlled end play; sturdy die cast machined frame; fin-line tunetional styling with 198 sq. in. of cooling surface and internal air circulation.

"Dime" Size Switch Developed for Appliances

A NEW snap-action switch about the size of a dime is in production at Mu-Switch Corp., Inc., Canton, Mass. Called the Q-Switch, it is designed for incorporation in electrical appliances—irons, washers, mixers, timers and other domestic and industrial electrical mechanisms.

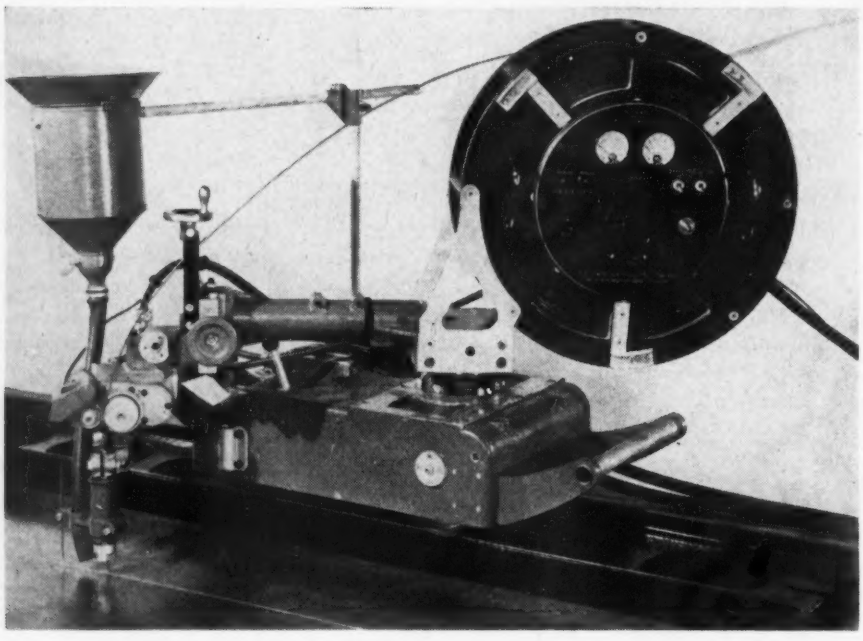
The switch is stated to have high



current-carrying capacity, long life, and to be available with normally open or normally closed contacts; and single or double throw, single pole.

• • •

190-lb. Automatic Welder Delivers Up to 1,200 Amp.



A 190-LB., portable automatic welding machine which has an output of 1,200 amp. has been developed by Linde Air Products Co., 30 East 42nd St., New York 17, N. Y. The company reports the new machine, known as the DS-37, will butt-weld, in a single pass, material from 16 gage to ¾ in. thick; position fillet weld with legs measuring ⅛ to ¾ in.; non-position fillet weld with legs from ⅛ to ⅜ in.; and plug weld in material ¼ to 1¼ in. thick. It will accommodate coiled rods $\frac{3}{32}$ to ¼ in. in diameter.

The machine can be placed directly on the work and hand guided; it can be mounted on standard track or guided by a structural angle clamped to the work for production welding.

Extensions are available for lengthening the nozzle assembly when making non-position welds or welds below the level of the carriage. The welding head can be swung forward through 45 degrees, tilted at any desired angle to either side, or positioned at any point in a circle around the carriages, the company reports.

The head supporting arm can be extended up to 5 in. The head also has a vertical adjustment of 5 in., or it can be set to permit vertical motion as the guide wheel follows the surface of the work piece. Small vertical and lateral adjustments for positioning the welding head are made by handwheels.

The type D series control is mounted within the plastic rod reel frame. The welding head and rod reel are mounted on a high-speed carriage, which the manufacturer reports has stepless speed control from 7 to 210 in. per minute. The machine welds by the Unionmelt process which is a technique of welding electrically beneath a layer of granulated mineral composition with visible arc.

TECHNICAL LITERATURE

Pole Guards—"Specifications for Pole Guards," TD-12, 1946, covering types commonly used in overhead line construction, are available from Edison Electric Institute, 420 Lexington Ave., New York, N. Y.

Adhesives—"Symposium on Adhesives," which contains seven technical papers, is available from American Society for Testing Material, 1916 Race St., Philadelphia 3, Pa. at $1.00 per copy.

Farmstead Wiring—A 44-page book covering all steps of farm electrification and wiring has been made available by Westinghouse Electric Corp., Box 1017, Pittsburgh 30, Pa. It lists many of the electrical applications and the power requirements of each. It contains charts and graphs covering current and circuit requirements. The Farm Wiring Booklet, B-3874, covers both 115 and 230 volt circuits and is available at 25 cents per single copy.

Glass—"Standards on Glass and Glass Products," a compilation of 96 pages including standard definitions, tests, and specifications for glass, is available from American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. at $1.25 per copy. Among other products, it covers insulators, sleeves, braids, and tapes.

Tubes—A new 156-page receiving tube brochure for equipment designers and radio set manufacturers has been published by the General Electric Electronics Department, Syracuse, N. Y. It covers the complete tube line and associated circuits. It contains ratings, curves and companion technical data for each tube type.

Food Freezers—Recommended design for various types of city and farm home food freezers is presented in a 12-page pamphlet, Home Food Freezers—Refrigerating Engineering Application Data 37. It was prepared by R. H. Bishop with the assistance of a ASRE Committee and is available from the American Society of Refrigerating Engineers, 40 W. 40 St., New York 18, N. Y. for 30 cents per copy.

CATALOGS and BULLETINS

A monthly digest of recent manufacturers' literature compiled by Electrical World for your convenience in securing without obligation the most recent information on electrical and allied products.

CHECK ON COUPON BULLETINS DESIRED AND MAIL TO US. WE WILL FORWARD REQUESTS TO MANUFACTURERS

1 WIRE & CABLE: Eight-page catalog illustrates and describes service entrance cables approved by the Underwriters' Laboratories. Detailed description of each cable is given, showing how each kind of cable is used. Also given are the weights per thousand feet of cable and the physical dimensions. Simplex Wire & Cable Co.

2 BRANCH CIRCUIT WIRING CHART: A new chart showing changes in branch circuit wiring requirements in the 1946 National Electrical Code is being distributed by the wire and cable department of this company. The chart indicates the difference between the 1940 and 1946 codes. United States Rubber Co.

3 BOILERS, FUEL-BURNING & RELATED EQUIPMENT: This is a 12-page condensed catalog (GC-10) of products for stationary power plants. Each class of equipment is summarized. Illustrations of typical units in each class group of boilers ranging from 1,000-lb. per hr. up to 1,000,000-lb. per hr. capacity, with steam pressures up to 1,800 psi. and 955 deg. total steam temperature. Seven types of stokers are included also as well as the bowl mill, horizontal and tangential burners for pulverized coal, superheaters, economizers and air heaters of both the plate and tubular types. Combustion Engineering Co., Inc.

4 EARTH DRILLS: Bulletin 1237 describes and illustrates earth drills designed to meet individual hole drilling needs. Types and models are available for truck or platform and trailer mountings with rigid or cradle type drill heads. Especially adaptable for pole line construction, bridge work, foundation work, etc. Each type of machine is described and fully illustrated. The Buda Co.

5 RHEOSTATS: Catalog 500 presents cast grid-type tank rheostats designed for electroplating control. Contains illustrations showing various ampere capacities of each rheostat. Construction features are also discussed. Columbia Electric Mfg. Co.

6 ELECTRICAL EQUIPMENT: Booklet B-3484 describes electrical equipment for every phase of the petroleum industry—drilling, pumping, transportation, refining and marketing. Includes photographs showing installation, and application of a.c. and d.c. drilling equipment, including semi-electric and full-electric drives; pump equipment including substations for utility power generators, transformers, distribution apparatus, motors, and gear-motor drives, etc. Westinghouse Electric Corp.

7 FIBRE CONDUIT & FITTINGS: Catalog U-46 lists a variety of fibre duct and fittings, giving description of each type, sizes, etc. A wide variety of outlets is also listed. Illustrations and construction drawings are furnished. Notes on methods of installing products are also given. The Fibre Conduit Co.

8 MAGNETIC SAFETY DISCONNECT SWITCHES: Bulletin 1024 describes and illustrates magnetic safety disconnect switches for d.c. cranes. Complete information as to ratings and dimensions is given covering the four sizes. Special feature of these switches is that they disconnect the crane from the main collector power-feeders running along the crane runway. The Electric Controller & Mfg. Co.

9 LAMPS: Manual A-621 features practical display and merchandizing ideas for department stores. More than 70 illustrations are used to picture effective displays of popular lamps and to show how the displays may be assembled. Includes 16 display fundamentals. Manual also contains a wealth of display suggestions intended for use by utility companies and other large retail outlets for lamps. General Electric Co.

10 ELECTRIC TYPING: Bulletin illustrates and describes how the company's new development, the Robotyper, operates a battery of electric typewriters. Robotyper Corp.

11 LIGHTING: Bulletin, "The Modern Way," describes the company's line of hot- and cold-cathode equipment. Also notes the advantages claimed for each of the two sources. Illuminating Engineering Co.

12 COLD CATHODE: A detailed brochure, entitled "Lighting to a T," comprehensive in scope, containing appropriate engineering data for architects, designers and electrical engineers, answers many questions about the company's cold-cathode lighting products. Cutler Lighting Mfg. Co.

13 FIRE FIGHTING: A fire protection handbook, No. R-5827, entitled "How to Fight Fires and Protect Property," contains illustrations and explanatory text on the use of carbon dioxide and other extinguishing mediums. Randolph Laboratories, Inc.

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ELECTRICAL WORLD June 7, 1947
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NEWS ABOUT PEOPLE

H. K. Breckenridge Elected West Penn Vice-President

Harvey K. Breckenridge, who has been associated with the West Penn Companies since 1925, has been elected

H. K. BRECKENRIDGE

a vice-president of West Penn Power Co. For the past eleven years, he has been assistant to the president and personnel director for West Penn Power and Railways Companies, in charge of employee relations activities.

Mr. Breckenridge has served on many committees of the Pennsylvania Electric Association, and is chairman of the industrial relations committee of the Edison Electric Institute.

•

▶ P. R. WILLIAMS has been elected treasurer of the Virginia Electric & Power Co., and H. A. HITCH secretary. Mr. Williams succeeds GEORGE B. WILLIAMS, who retired on June 1 after 40 years' service as treasurer. Mr. Hitch succeeds RICHARD N. BENJAMIN of New York. JOSEPH V. MITCHELL, formerly assistant comptroller of the company, was elected assistant treasurer. Mr. Williams has been associated with a number of Stone & Webster properties since 1909. He went to Virginia from Beaumont, Tex., where he was treasurer of the Gulf States Utilities Co. He has been comptroller of Virginia Electric since 1934. Mr. Hitch spent the early part of his business career with the Pennsylvania Railroad. He joined the organization of the Eastern Shore Public Service Co. at Salisbury in 1926 and since then has been affiliated with several other organizations in various sections of the country. His connections in the light and power field have included the properties at Marion, Ohio, and Virginia Public Service Co.

•

C. D. Hepler Heads Trumbull Sales Organization

Vice-President Carroll D. Hepler has been placed in charge of all sales activities of the Trumbull Electric Manufacturing Co., Plainville, Conn. Mr. Hepler was employed as assistant to the president of the A. G. Manufacturing Co. of Seattle and Los Angeles when that company was acquired by the Trumbull company in 1929. Late that year he was appointed manager of the Trumbull Seattle plant, and in 1933 was elected vice-president and general manager of the Trumbull Pacific Division. He became president of the Trumbull Pacific Division in 1945 and

C. D. HEPLER

was elected vice-president of the parent Trumbull corporation a year later. In this latter capacity he has been responsible for all manufacturing activities.

Mr. Hepler is active in NEMA.

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▶ GEORGE HIBBERT, manager of the Clark County, Wash., Public Utility District, has resigned.

Chelsea Products Names G. Read General Manager

George J. Read, formerly director of economic research for the Consolidated Edison Co., New York, has been made general manager of Chelsea Products, Inc., Irvington, N. J. In his new position, he will be active in the sales promotion, advertising, and management aspects of the company's business.

After serving in the electrical branch of the Navy during World War I, Read was graduated with an electrical engi-

G. J. READ

neering degree from the University of Pittsburgh in 1924. After serving as an assistant transmission engineer for an electric utility holding company, he joined Consolidated Edison in 1927.

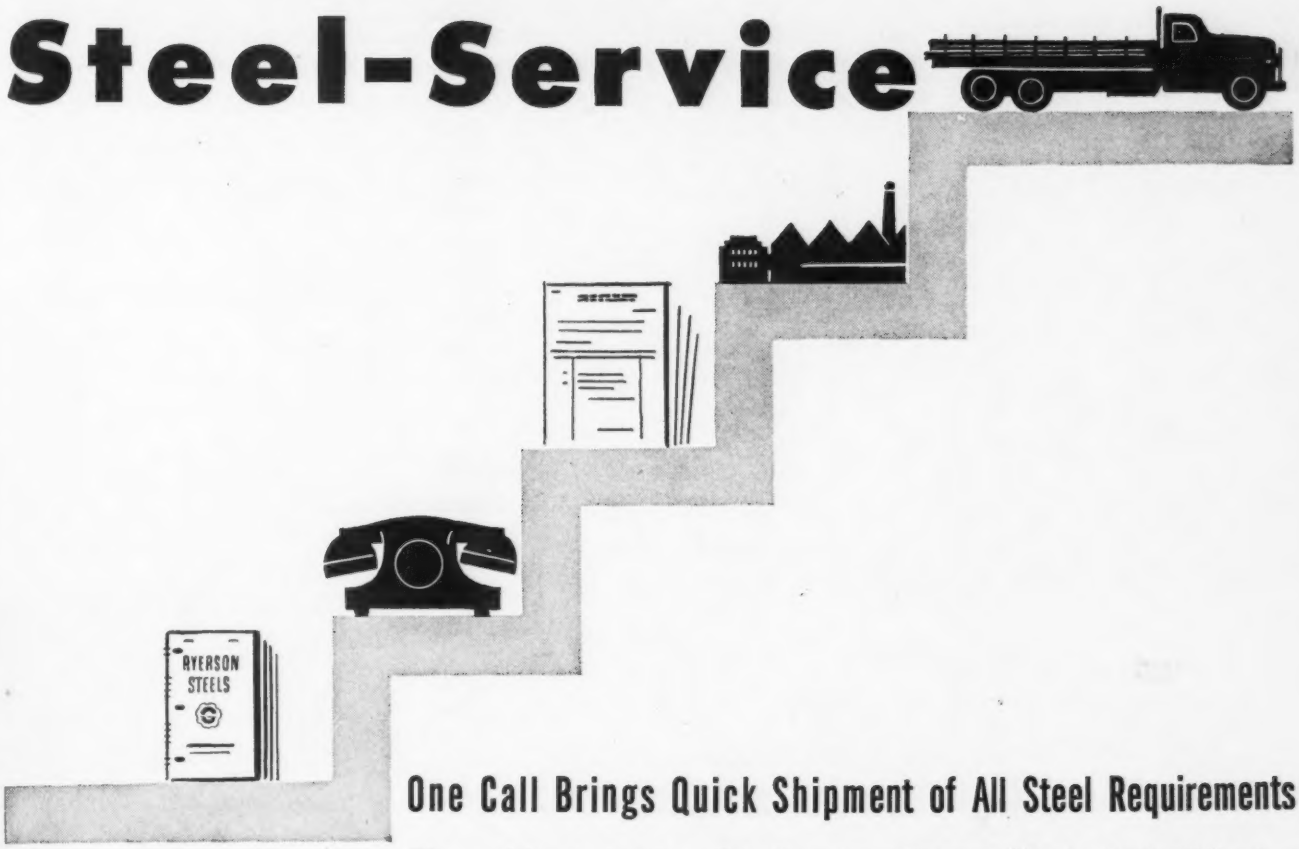
•

▶ JOHN H. TAYLOR, supervisor of the dealers' development division, has been promoted to customer service manager of the British Columbia Electric Railway Co.

▶ C. H. NELSON, formerly engineer for the Minnesota Taxation Department, is now manager of the light and water commission at Aitkin, Minn.

▶ C. T. BAKEMAN, formerly director of industrial development with the Puget Sound Power & Light Co., Seattle, Wash., has recently been appointed factory representative for the F. W. Wakefield Brass Co. and the Silvray Light-

Stairway to Steel-Service



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The need for steel and a call to the nearest Ryerson Plant—that's all it takes to start the smooth-flowing mechanism of Ryerson Steel-Service—a service designed to meet your steel needs as conveniently and as promptly as possible.

At Ryerson each step in the process of filling your order is geared to peak efficiency—carefully executed to eliminate every unnecessary delay between order desk and point of delivery. The most modern steel cutting and handling facilities meet your specifications quickly, with maximum precision.

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—here's how to SAFEGUARD it!

Apply carbon dioxide with a *Kidde* Portable Extinguisher

Simple, fast and sure in action, *Kidde* Carbon Dioxide Hand Portables offer an ideal way of extinguishing small fires in auxiliary apparatus—MG sets, capacitors, lightning arresters.

All sizes of *Kidde* Hand Portables are equipped with trigger-finger control . . . all work the same quick, natural way. Just aim at the fire and pull the trigger!

Carbon dioxide capacities range from 2½ to 25 pounds. Smaller sizes are especially useful for fighting minor blazes in test labs and meter rooms . . . larger sizes pack plenty of wallop for relatively severe fires.

You'll find it pays to have a few *Kidde* Portables on hand to supplement your built-in carbon dioxide protection systems.

Remember . . . carbon dioxide is dry, inert, non-conducting, clean.

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Kidde

FIRE PROTECTION HEADQUARTERS

ing Co., Inc. with headquarters in San Francisco. Recently elected a fellow of the Illuminating Engineering Society Mr. Bakeman has been an active member of the Pacific Northwest Region of that society for many years.

•

Russell Made President, Dallas Chairman, Revere

C. Donald Dallas, president of Revere Copper & Brass Incorporated, has been elected chairman of the board of direc-

C. D. DALLAS

tors and James J. Russell has been elected president. Breck Aspinwall was elected secretary and A. E. McCormick was named treasurer. Charles A. Mac-

J. J. RUSSELL

fie, for many years a vice-president in charge of merchandise sales, has been appointed general sales manager. Cornelius C. Felton, for many years a vice-president, has been appointed assistant to the chairman of the board.

Mr. Dallas, who was instrumental in effecting the 1928 merger of the six independent large brass and copper companies that ultimated as Revere Copper

NOW . . . New Types of ELKONITE* CONTACTS *for Light Duty Applications Like This*

FOR quite a number of years now Elkonite has been *the* standard contact material for heavy-duty circuit interrupting equipment. A Mallory-developed material, Elkonite has been famous for its hardness and electrical conductivity—for its resistance to sticking, to erosion by arcing, to mechanical wear and impact.

Now this same material—fabricated differently and somewhat changed in composition—is available for applications in the light duty field: applications like small relays, mechanical breakers, thermal breakers and similar equipment where silver alloys have heretofore been used.

It has an advantage over silver in that it is less subject to sticking and has a higher hardness. It is superior to most non-silver alloys in its improved finished and uniform contour, which requires no machining. And it is lower in cost than standard Elkonite—available in smaller sizes, too. On the other hand, it will not resist extremely heavy arcing, as standard Elkonite will.

If you need a contact material where the maximum physical properties of true Elkonite are not required, yet where silver does not meet the specifications, here is something to investigate. These new grades of Elkonite are available in standard rivets and projection welding blanks—or can be used in special contacts made to your order. Write for more information.

The only volume of its kind in the world, this Mallory Contact Data Book contains everything you want to know about contact design, construction, application and materials. Free to engineers who write on company letterhead. $2.50 to others.

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MALLORY ELECTRICAL CONTACTS & CONTACT ASSEMBLIES

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Picture of an off-peak friend

Here's the off-peak load-builder you've been looking for . . . the G-E Automatic Blanket!

"Working hours" for this electrically controlled blanket are *bedtime to breakfast time.* And here's the kind of load-building you can expect . . . Two G-E Blankets equal one six-foot refrigerator in kilowatt hour consumption.

Tell your customers about this soft, lightweight, electrically warm blanket . . . this wonderful way to sleep *undisturbed* all night long.

We're telling them, too—with full-color advertisements in top-circulation magazines—*Life, Good Housekeeping, This Week,* and *National Geographic.*

And we're telling them about a big new G-E extra—*in addition* to the G-E One-Control Blanket. The new Two-Control Automatic Blanket—*exclusively* G.E.!

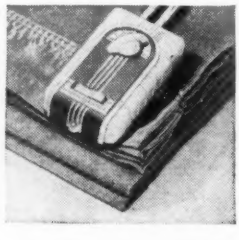
Two separate controls, one for each half of the blanket, can be set separately.

Double-bed sleepers can snooze happily under one blanket—at the comfortable temperatures they select on their separate Bedside Controls.

Write us today for complete information, including ways to make the most of this new load-builder that works while your customers sleep! General Electric Company, Appliance and Merchandise Dept., Bridgeport 2, Conn.

Automatic Blanket

"Goes to work when the lights go out"
Approved by Underwriters' Laboratories, Inc.



GENERAL ELECTRIC

& Brass, will continue as chief executive officer. His career in the copper fabricating business began in 1902. In 1908 he was associated with his father in the organization of the Dallas Brass & Copper Co. of Chicago, becoming president in 1918. Ten years later, at the time of the merger, he was named first vice-president in charge of manufacturing and sales and director of the company. In 1931 he assumed the duties of president.

Mr. Russell has been a director and treasurer of the company since its organization in 1928 and also for many years secretary and vice-president. He has been associated with the copper and brass industry for more than 40 years and has had practical experience in both production and administration fields.

Both Mr. Aspinwall and Mr. McCormick have been associated with the company for many years, Mr. McCormick since its organization in 1928.

•

Westinghouse Electric Makes New Appointments

Several new appointments have recently been announced by the Westinghouse Electric Corp.

J. H. JEWELL has been made manager of apparatus sales, with headquarters in Pittsburgh. A veteran of 27 years with Westinghouse, Mr. Jewell has been manager of the company's industry sales department since 1944. Recently he has been serving as acting manager of apparatus sales.

Appointments of WILLIAM B. GERO as assistant to vice-president and of THEODORE C. MONK as manager of manufacturing have been announced by Ralph C. Stuart, vice-president in charge of the Westinghouse Lamp Division at Bloomfield, N. J. Mr. Gero will assist Mr. Stuart in coordinating lamp division activities while Mr. Monk will direct all manufacturing operations of the division at plants in Bloomfield, Belleville and Trenton, N. J., and Fairmont, W. Va. Mr. Gero, who has been manager of Westinghouse lamp manufacturing since 1941, started with Westinghouse as a wire products engineer in 1916. He has been granted several patents on filament materials for electric lamps. Mr. Monk, staff assistant to Mr. Stuart for the past three years, joined the company as a clerk in 1920.

WILLIAM C. GALLATIN has been named meter specialist for the corporation's central station sales division, Pacific Coast District, with headquarters in San Francisco. He succeeds J. E. BRIDGES, who retired after 40 years' service with the company. Before en-

10 MILES OF FIBERGLAS TAPE— on 43,750 kva. turbo-generator

This turbo-generator, being built by the Westinghouse Electric Corporation, is capable of supplying enough power to take care of the electrical requirements of a community of approximately 35,000 persons.

About 10 miles of Fiberglas tape was used to insulate the end connections of the armature. Here is an application that is typical of many in which Fiberglas-base insulating materials provide a margin of safety in many types of electrical equipment.

Fiberglas-base insulating materials have a high resistance to moisture, corrosive acids and vapors and the effects of overloads. They will withstand heat far beyond the temperature range of even the newer insulating varnishes. Therefore, should the impregnants burn out, the Fiberglas base still provides protection as a permanent spacer.

Fiberglas Electrical Insulating Materials are available in forms to meet practically every insulation need. If you are concerned with the design, manufacture, use or maintenance of electrical equipment, get all the facts about Fiberglas Electrical Insulations. Write for catalog EL46-11—Owens-Corning Fiberglas Corporation, Dept. 858, Toledo 1, Ohio. Branches in principal cities.

In Canada: Fiberglas Canada Ltd., Toronto, Ontario.

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ELECTRICAL INSULATING MATERIALS

TAPES • CLOTHS • BRAIDED SLEEVING • VARNISHED TUBING • MICA COMBINATIONS • LAMINATES

SPEED post digging with this PERFECTION post hole digger

This SturdE digger is designed and engineered for speed—built by the strongest known method of construction. Blade and shank are forged from *one solid piece* of high carbon steel, then heat treated. The blade takes and *holds* a keen cutting edge.

Ash handles are square for two to three feet above blade. Then, tapered and rounded to give a firm, hand-fitting grip. The blade is attached to handle by hardened bolts that won't crystallize and shear off.

These special SturdE features give you a Perfection Post Hole Digger that is easy and economical to use. Manufactured by The American Fork and Hoe Company, Cleveland, Ohio, Makers of True Temper Products.

STURDETOOLS
A TRUE TEMPER PRODUCT

Tapered blade is 12 in. deep by 7 in. wide, forged from one solid piece of high carbon steel. Made in regular and heavy duty lengths. No seams, no joints, no welds to weaken and fail. Ash handles (7 and 8 ft.) sanded and lacquered, have a 34 in. span when open, carry foot marks to show depth of hole.

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tering military service in 1943, Mr. Gallatin was connected with the Pacific Gas & Electric Co.

Announcement has been made by T. J. Newcomb, sales manager of the Westinghouse Electric Appliance Division, of the formation of the apartment house and builder sales department to replace the former home building department. W. R. ARBUCKLE, formerly head of the home building department, will be manager of the new department. He has been with Westinghouse since 1935.

•

General Electric Assigns New Engineering Duties

Announcement has been made of several recent engineering appointments by the General Electric Co.

THOMAS M. LINVILLE has been named staff assistant to E. E. Johnson, manager of engineering in General Electric Co.'s apparatus department at Schenectady. Mr. Linville's duties will include, in addition to special assignments, technical direction of engineering education for the apparatus department and coordination of the development programs of all G.E. motor and generator design engineering divisions. Mr. Linville entered the company's test course following graduation from the University of Virginia in 1926. Last December he received the Charles A. Coffin Foundation Award, given by General Electric, for "Outstanding development of design methods for d.c. machines and application to propulsion machines for submarines in World War II."

Three assignment changes in the industrial engineering divisions of the apparatus department have been announced. H. W. ROGERS has relinquished his responsibilities as engineer of the paper and textile division to become engineering consultant in the division with special assigned duties. G. W. KNAPP, formerly engineer, rubber and printing division, was appointed to the position formerly occupied by Mr. Rogers, while C. E. Miller, engineer in the rubber and printing division, was appointed to succeed Mr. Knapp. All three started with General Electric in the test course.

L. R. BIGGS, assistant manager of the construction engineering division, has succeeded C. M. Rhoades, who has retired as manager.

CLARK M. WRIGHT, sales engineer, Chicago office, has been appointed assistant manager of the turbine division in Schenectady.

R. M. DARRIN has been appointed assistant district manager, central station division, New York district. Mr. Darrin has been New York district

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CORRECT UNWINDING TENSION
NON-RAVELING—CLEAN CUTTING
HIGH TENSILE STRENGTH
TIGHT STICKING—FAST HOLDING
GOOD DIELECTRIC QUALITIES
STRAIGHT, EASY TEAR-OFF
GUARANTEED FOOTAGE

You will find all these qualities in ACCURATE tapes. ACCURATE tapes—friction and rubber—are made in the modern ACCURATE plant devoted exclusively to the manufacture of fine electrical tapes. Although ACCURATE tapes are produced to exacting standards under rigid quality control and from the finest materials obtainable they cost no more than other tapes.

Electricians know good tape makes their work easier and faster. Good tape—ACCURATE tape—handles fast and easy. It makes smooth joints that can't be beaten. ACCURATE tapes are real time and money savers and every roll is guaranteed for full footage. Ask for it by name—ACCURATE.

ACCURATE MFG. COMPANY
General Offices & Plant: Garfield, New Jersey

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Planned Lighting...

WHEN YOU'RE SHOPPING FOR *Certified Lamps*

HERE ARE TWO *"Musts"!*

Certified TABLE LAMPS

BY L. ROSENFELD & CO. INC.

One of America's Largest Makers of Table Lamps and Shades

Here's a complete line of CERTIFIED Table Lamps, all wearing the tag of the new CERTIFIED LAMP MAKERS... which means top lighting performance — highest quality construction. Coupled with exciting new styling and design, you'll find beautiful new table lamps to fit every taste and purse.

SEE THEM...

***In Chicago*—1273 MERCHANDISE MART**
***In New York*—15 EAST 26TH STREET**

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15 EAST 26TH STREET • NEW YORK

Certified BOUDOIR LAMPS

BY ROBERT ABBEY, INC.

One of America's Largest Makers of Boudoir Lamps and Shades

These amazing new CERTIFIED dresser and dressing table lamps now give discriminating women the light for make-up, light for decoration and new room beauty so long sought-after. Robert Abbey, Inc. introduces these lovely new lamps in a wide variety of styles, materials and prices.

SEE THEM...

***In Chicago*—1274 MERCHANDISE MART**
***In New York*—373 4TH AVENUE**

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Extra strength ... resistance to corrosion ... resistance to season cracking ... these are some of the qualities of Harper Silicon bronze fastenings which have led to their use by scores of power companies and electrical equipment manufacturers. These fastenings go into sub station assemblies, pot heads, pole line hardware, grounding equipment, and a host of other applications.

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Harper maintains a large and widely assorted stock of Silicon bronze bolts, nuts, screws, washers, and rivets. Moreover, similar stocks are maintained in brass, naval bronze, copper, Monel and stainless steel. Ask for summarized catalog.

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Harper engineers specialize in the manufacture and use of non-ferrous and stainless fastenings. Submit your fastening problems to them.

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EVERLASTING FASTENINGS

manager of the transportation division since 1945 and HORACE A. DAVIS has been named to succeed him in this position. Since 1939, Mr. Davis has been sales engineer for the transportation division, New York district.

LEO P. HANNAWAY has been appointed plant manager of the recently acquired factory at Somersworth, N. H., for the production of electrical measuring devices. N. M. DUCHEMIN, manager of the West Lynn Works of the company, will be general manager.

DR. GLENN T. SEABORG, professor of chemistry at the University of California, and co-discoverer of the artificial element plutonium used in one form of atomic bomb, has been named as consultant in nucleonics to the General Electric Research Laboratory in Schenectady.

DAVID P. BURLEIGH, appointed in 1910 as the company's first district meter specialist, has retired after 44 years of service with the company. In 1930 Mr. Burleigh received the Charles A. Coffin Foundation Award for outstanding selling, for his share of the work in obtaining a $2,500,000 order for demand metering equipment.

•

New Appointments Made by Connecticut Utility

John S. Tucker has been appointed manager for the Connecticut Light & Power Co. at Niantic, succeeding the late James T. Sherlock. He was employed by the Narragansett Electric Light Co., Providence, R. I., from 1916 to 1929; became superintendent of the C. L. & P. company's predecessor, the Central Connecticut Power & Light Co., at Essex in the latter year, and has been with the utility in various capacities since. Thomas J. Flanagan has been named supervisor of welfare and personnel, reporting to C. J. Allen, vice-president of public relations; Robert E. Lagerquist becomes assistant supervisor of welfare and personnel; and Joseph R. Maher is now supervisor of employee training and customer relations, reporting to Mr. Allen, whose headquarters are at Waterbury.

•

▶ T. J. NEWCOMB, merchandise sales manager of Westinghouse Electric Corp., has been elected chairman of the National Adequate Wiring Bureau's executive committee. Succeeding E. O. Shreve, vice-president of General Electric Co., who has been granted a temporary leave of absence from his company to fill the honorary position of president of the U. S. Chamber of Commerce, Mr. Newcomb assumes the chairmanship after several years of

FIRE
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FOG NOZZLES

fight fire with these four distinctive features:

1 Non-clogging—clear free-flowing passages without screens.

2 Maintain fog pattern—even at reduced pressures in emergency.

3 Deliver powerful fog—strike to base of fire in spite of drafts and air turbulence, indoors or outdoors.

4 Maximum cooling and quenching effect—finely atomized fog takes the heat out of burning gases, liquids or other combustibles.

Write for details.

Also—

Blaw-Knox offers Standard Wet and Dry Pipe Automatic Sprinkler Systems as well as Thermostatically Controlled Pre-Action and Deluge Systems.

BLAW-KNOX
SPRINKLER DIVISION
829 Beaver Avenue, N.S.,
Pittsburgh 12, Penna.

Ethylene—

FOR EXAMPLE

Fractionation unit of an ethylene plant, one of many such plants designed and constructed by Stone & Webster Engineering Corporation.

Over a half century of broad experience qualifies our organization to assume full responsibility for all phases of design, engineering and construction of projects in the petroleum and chemical industries.

STONE & WEBSTER ENGINEERING CORPORATION

A SUBSIDIARY OF STONE & WEBSTER, INC.

SUPERIOR

SINCE 1923

The name SUPERIOR has stood for top quality meter testing and installation equipment — built specially for the

UTILITY INDUSTRY

SUPERIOR SWITCHBOARD & DEVICES CO.

CANTON 1, OHIO

A subsidiary of The Union Metal Manufacturing Co.

close association with the Bureau's activities. He has been a member of the NEMA Adequate Wiring Committee since 1945 and was appointed to the Bureau's executive committee last January.

▶ J. I. ONARHEIM has joined the staff of the central station and marine sales department of the Allis-Chalmers Mfg. Co. In his new position, Mr. Onarheim, who has had more than 20 years of design and sales engineering experience in the company's electrical department, will assist both the product departments and the district offices in the promotion and coordination of sales activities with utilities and municipalities. For the past seven years, Mr. Onarheim served as the company's employment manager.

▶ ANTHONY M. KOHLER, general manager of the refractories division of the Babcock & Wilcox Co., and ALAN E. PHIN, controller, have been elected vice-presidents of the organization.

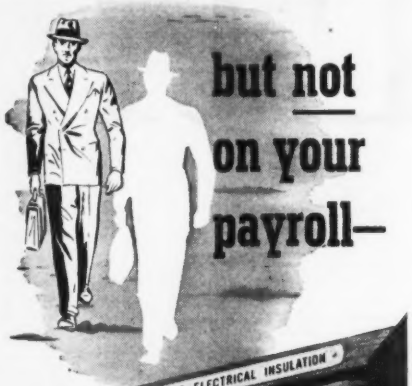
▶ EDWARD L. STALNECKER, household sales manager of the Cleveland zone for Nash-Kelvinator Corp., has been made Cleveland zone manager.

OBITUARY

▶ JENS LUDVIG HANSEN, consulting electrical engineer and manufacturers' representative of Denver, Colo., died of a heart attack on April 24 in that city at the age of 77. Born in Copenhagen, Denmark, he received his education at the Royal Danish Navy Electrical College in Copenhagen and worked in Denmark until 1899, when he went to Siam, where he served in a number of engineering capacities, including chief engineer, with the Siam Electricity Co. During his association with this utility, which covered a period of 18 years, he was decorated by the king of Siam for outstanding service to the nation. In 1917 Mr. Hansen came to this country and served as chief engineer of the Ashton and St. Anthony (Idaho) Power Co. for five years before establishing a consulting practice in Denver. He was a life member of the American Institute of Electrical Engineers and a member of the Institution of Electrical Engineers (Great Britain).

▶ CLARENCE J. KIM, assistant sales manager of the National Electric Products Corp., Pittsburgh, Pa., died on May 15, following a long illness. He was 55 years old. A native of Pittsburgh, Mr. Kim became identified with National Electric Products in 1914 and had been serving as assistant sales manager for the past 20 years.

THE IMC ENGINEER IS ON YOUR STAFF



The IMC Engineer offers two important services to help you solve electrical assembly problems:

1. A complete line of nationally advertised insulating materials.
2. Expert advice and engineering service on the best application of these materials.

Ask your nearby IMC engineer to help you solve your insulation problems. He is trained in the application of electrical insulation, and can usually suggest an answer from his experience and complete line of products.

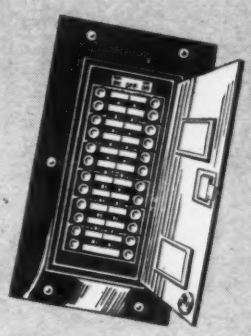
INSULATION MANUFACTURERS CORPORATION

ELECTRICAL IMC INSULATION

* CHICAGO 6, 565 West Washington Blvd.
* CLEVELAND 14, 1231 Superior Ave., N.E.
MILWAUKEE 2, 312 East Wisconsin Ave.
DAYTON 2, 1315 Mutual Home Building

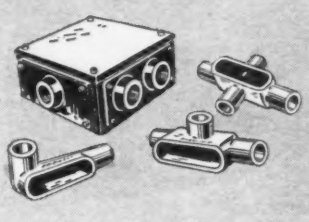
REPRESENTATIVES in: DETROIT 2, 11341 Woodward Ave., MINNEAPOLIS 3, 1208 Harmon Pl., and PEORIA 5, 101 Heinz Court.

On Surplus



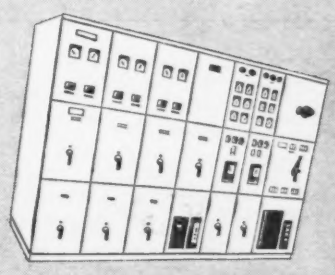
LIGHTING PANEL BOARDS—DISTRIBUTION PANEL BOARDS. There are wall and column types—both large and small capacity. Some have interlocked doors for added safety. In many cases, their construction permits alteration without disturbing wiring connections. This equipment will be offered on sealed bid basis. Largest inventories are held by: Boston, New York, Cincinnati, San Francisco, Seattle, Birmingham, Spokane, Los Angeles and Portland. Other regions have smaller stocks.

★ ★ ★



FLOOR BOXES AND COVERS — SCREWED CONDUIT FITTINGS — JUNCTION, SWITCH AND OUTLET BOXES AND BOX COVERS. Some standard, some explosion-proof, *all* of these units are of high quality and proved dependability. There are many types and sizes available to meet your needs. Some items are being sold on a fixed price basis, others on competitive sealed bid. Large inventories are held by the following Regional Offices: Boston, Chicago, Little Rock, Los Angeles, New York, San Francisco, Seattle and Spokane. Other regions have smaller stocks.

★ ★ ★



CIRCUIT BREAKERS—OIL CIRCUIT BREAKERS—AIRBREAK SWITCHES —SWITCHBOARDS—ASSORTED ELECTRICAL SWITCHGEAR. Both oil and air types of circuit breakers are offered in this great sale. Many types and sizes of panels and electrical switchgear are available and *all* are of high quality. This equipment will be offered on both Fixed Price and Sealed Bid Sales. Regions holding largest inventories: New York, Philadelphia, Denver, Chicago, Richmond, Atlanta and Detroit. Other regions have smaller quantities.

OFFICE OF GENERAL DISPOSAL

WAR ASSETS ADMINISTRATION

GOVERNMENT WAA SURPLUS

Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago Cincinnati • Cleveland • Denver • Detroit • Grand Prairie, Tex. • Helena Houston • Jacksonville • Kansas City, Mo. • Los Angeles • Louisville • Minneapolis Nashville • New Orleans • New York • Omaha • Philadelphia • Portland, Ore. • Richmond St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane • Tulsa

1153

MANUFACTURERS & MARKETS

Allis-Chalmers Leaders May Face Federal Charges; Discharge Upheld

The Department of Justice has under consideration charges against Harold Christoffel and Robert Buse, leaders of the last two strikes at the Allis-Chalmers Mfg. Co., Milwaukee. The exact nature of the charges was not made known but they are reported to have been brought about by the recent investigation of the House Labor Committee.

Christoffel, a former president of the United Automobile Workers, Local 248, C.I.O., was leader of the 76-day strike at the company's West Allis plant in 1941; Buse, present president of Local 248, was leader of the union during the recent 10-month strike at the same plant.

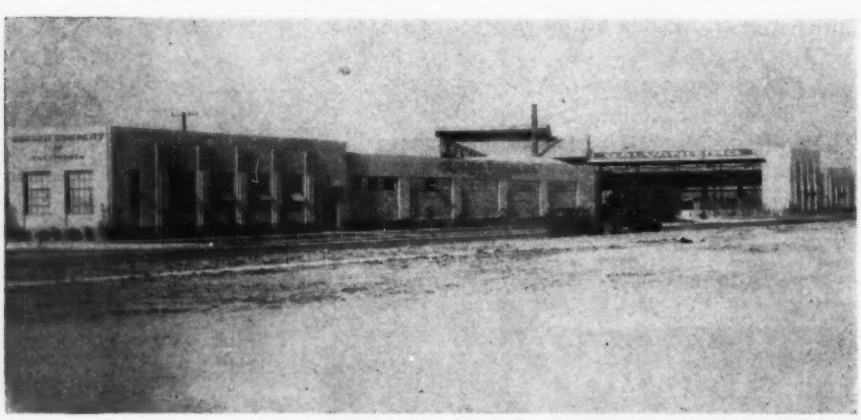
The House Labor Committee report, part of which is being suppressed at the request of the Justice Department, charges that Christoffel called the 1941 strike "at the direction of the Communist party and for the purpose of carrying out its program. In doing this he used over 2,000 fraudulent ballots and betrayed his fellow workers, his employer, and country." The committee recommended that the Justice Department "take whatever steps the evidence warrants."

The committee stated that there is "conclusive evidence" that Christoffel "testified falsely under oath" before the investigating subcommittee. In his testimony, he had denied party affiliation. The committee also stated that there is "substantial evidence" that Buse likewise falsified his testimony.

The committee at the same time strengthened the company's hand when it contended that "any employer or a union should be free to discharge or expel any employee who is a member of the Communist party." Allis-Chalmers had previously discharged both men but Local 248 had appealed to the NLRB that this action constituted an unfair labor relations act.

The Committee further stated, "We believe that the Communist influence at Allis-Chalmers during the last ten years has created tension, irritability, suspicion and ill-will which has caused constant friction between this employer and its employees. The class hatred which the Communists constantly seek to arouse against employers inevitably hampers and destroys the ability of both sides to engage in sound collective bargaining. They can have no confidence in each other.

"It is with this thought in mind that we propose that any employer or union should be free to discharge or expel any employee who is a member of the Communist party. Furthermore, no employer should be required to bargain with any representative of his employees who is a member of the Communist party or by reason of active and consistent promotion or support of the policies, teachings, and doctrine of the party can reasonably regard him as being a member of or affiliated with that party. Congress cannot afford to deny employers and unions these rights if we are to preserve a free enterprise system in the United States."



BIGGER AND BIGGER—Construction is under way on a 12,000 sq. ft. addition to the Joslyn Co. of California steel plant. Located at 5100 District Blvd., the new addition will house the hot-dip galvanizing department of the pole line construction materials division. The company is expanding to keep pace with Western industrial developments

•

Home Wiring Devices Set Output Peak in 1st Quarter

Production of electrical wiring devices used in home construction reached a record peak during the first quarter of 1947, according to the Office of the Housing Expediter.

OHE, which took over the extinct CPA's controls over housing materials, asserted that wiring device production still had not reached the level necessary to meet essential requirements. The agency noted that manufacturers continued to experience difficulty in procuring raw materials, particularly steel, phenolic resin compounds, pig iron, and components such as screws and porcelain bodies.

The agency released the following production figures, based upon reports by manufacturers on millions of units produced for residential use:

Item	March	April	1st Quarter 1947	May (Scheduled)
Toggle switches..	5.2	6.1	13.8	6.3
Convenience outlets	5.7	6.0	14.2	6.5
Sockets	13.7	17.0	38.5	16.8
Outlet, switch and receptacle boxes	10.9	11.4	31.6	11.4
Box connectors for BX and Romex Cable	11.5	12.2	32.2	12.5

•

Votes Change in Name

Stockholders of Electric Household Utilities Corp., Chicago, have voted to change the name of the company to

UNITED STATES RUBBER COMPANY

SERVING THROUGH SCIENCE

Neolay

AMERICA'S FINEST

Aluminum *Cables*

by the Wire and Cable Department
UNITED STATES RUBBER COMPANY

New insulated aluminum conductors—pioneered by "U. S."—are here and here to stay! Because they're as much as 50% lighter than ordinary cables. Economical to buy and install. Neoprene cover is tough, abrasion resistant—also resistant to oil, fire, and cold. Write for new 32-page brochure describing all types and sizes of "U. S." aluminum wires and cables. Address Wire and Cable Department, United States Rubber Company, 1230 Avenue of the Americas, New York 20, N. Y.

UNITED STATES RUBBER COMPANY · US · TRADE MARK

for

HIGH CONDUCTIVITY
ONE-PIECE STRENGTH
PERMANENT TIGHTNESS
FAST PRODUCTION
SURPRISING LOW COST
NO MAINTENANCE

Whether you have only a few electrical connections to make, or thousands—there's no simpler, faster, more economical way to make them than brazing with SIL-FOS. That goes for terminals, lugs, leads, coil windings, bus bars or any other copper connections. Actually, connections made with this fast-acting, low-temperature silver brazing alloy, *equal the unjoined metal* in all properties you need in electrical connections

FOR SIL-FOS FACTS
write today for
BULLETIN 12-A

HANDY & HARMAN
82 FULTON ST., NEW YORK 7, N. Y.
Bridgeport, Conn. • Chicago, Ill. • Los Angeles, Cal.
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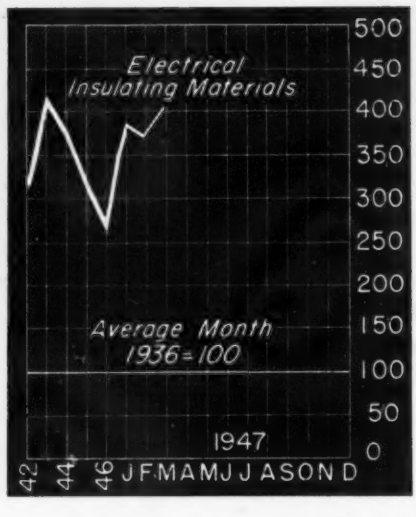
Agents in Principal Cities

Thor Corp. The new name incorporates the familiar "Thor" trademark with which the company has been associated for more than 40 years. Beyond a change of name, no other changes are being made in the company personnel or method of operation.

•

Insulating Materials Sales Advance 81% Over '46

Sales billed on electrical insulating materials during the month of March advanced 32 points over the total recorded for the month of February, according to figures released by the National Electrical Manufacturers Association. The index compiled by NEMA moved upward to 405 from 373 in February, an increase of 9 percent. This compares with 224 in March, 1946, this year's figure representing an increase of 81 percent.



The monthly index of orders received for motors and generators is being revised to a quarterly basis.

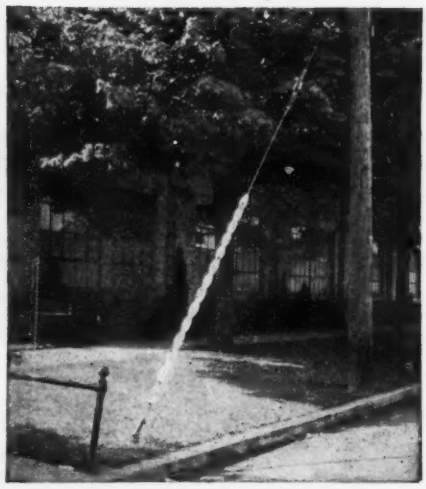
•

Price Adjustment on G.E. Lamps Is Announced

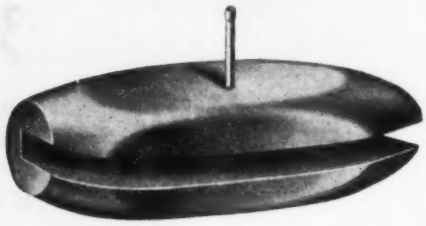
M. L. Sloan, General Electric Co. vice-president and manager of its lamp department, made the following announcement regarding price adjustments on G.E. lamps effective June 1:

"The latest wave of wage increases has so raised our material and labor costs that the lamp department of the General Electric Co. can no longer absorb the 5 percent federal excise tax on lamps that we have been absorbing since 1941. We sincerely regret that beginning June 1, 1947, this tax will have to be paid by our customers.

"At this same time the Lamp Department is making price adjustments on certain lamps; some being decreased



THE NEW GUARD THAT HAS BECOME SO POPULAR



Flexibal

The GUARD that *gives* with the GUY

Literally a string of pillows, the Overton-Flexibal Guy Guard cushions the shock. It is the only guard that *gives* with the guy. No other type is so easy to handle, so simple to install. None other is so effective in cutting down losses. Nothing ever puts it out of commission. And they cost less! Separate spindles, smoothly shaped, are made of hard wood and aluminum-painted for greatest visibility and long life. Adjustable to any length in 6-inch steps. 5-6-7-8 foot lengths boxed for immediate shipment,—no waiting. Modernize your guy wire guards now,—you'll never go back to the old rigid style once you try Overton-Flexibal. Field-tested for years in thousands of locations.

AVAILABLE NOW, AND AT ALL TIMES

PACKAGED FOR EASY HANDLING AND STORAGE

Send for Free Sample

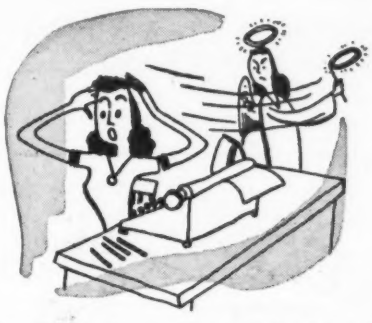
Flexibal **GUY GUARD**
is produced solely by
S.E. OVERTON CO.
SOUTH HAVEN, MICHIGAN

Office Patience is no virtue

It was as if an atom bomb, instead of an angel, had entered the room.

"I've come to take back your halos," the mad angel said. "I've just learned that Office Patience is no virtue!

"Satan—or some other black sheep—has had the wool over our eyes for too long a time."



It's a sin to type the same sales letter 100 times a day—when you need do it only once. Simply make 99 Ozalid Black-line prints of your original...then add headings, etc. Everyone will think his letter was completely typed. Deception? Yes, but you save 6 hours a day.

Waiting 25 minutes for photocopies or manual transcriptions of file cards and records merits a veto, not a halo. You should use *translucent cards*—and get Ozalid prints in 25 seconds.

Besides, each Ozalid print is a positive (not negative) copy. 100% accurate every time.

Unnecessary posting, checking, repeating add up to the biggest loss of all. Ozalid allows you to make composite reports from separate ledgers . . . to transfer information from one sheet to another in seconds—without lifting a pen. It makes possible dozens of basic short cuts that bring joy—and new accuracy—to every accountant.

Not a vision, but a new Ozalid Streamliner, which you should learn all about today.

In 25 seconds it reproduces anything typed, printed, drawn or photographed on translucent paper. And an 8½ x 11-inch print costs only *one* cent!

All the ways you can save time, labor, and dollars by using it are explained in "The Simplest Business System"—a new, illustrated booklet. Mail this coupon today for a *free* copy.

OZALID *DIVISION OF* DEPT. 85
General Aniline & Film Corporation
Johnson City, New York

Gentlemen: Please send *free* copy of "The Simplest Business System"... and Ozalid prints of typed, drawn, printed, and photographic material.

NAME_____

POSITION_____

COMPANY_____

ADDRESS_____

ONLY PIERCE FUSES

have the

RUGGED TUBULAR BRIDGE

- TO MAINTAIN BLADE ALIGNMENT
- TO INCREASE FUSE LIFE

Additional exclusive features that mean better protection and lower ultimate cost are:

1. Balanced Lag Link
2. Screened Ventilation

FREE: Balanced Lag Link to inspect and test. Specify amperage, voltage.

where continued high demand and resulting high volume makes this possible, and others being raised in price because of abnormally increased costs. However, the list prices of over 90 percent of our lamps including those for home and industrial use remain unchanged or are lowered.

"Apart from the mentioned excise tax, the average prices of General Electric lamps will, on June 1, be 5 percent under our pre-war prices."

•

6 Wire and Cable Firms Pay Consent Judgments

Six wire and cable manufacturers have paid consent judgments totaling $38,000 in settlement of a federal suit involving an alleged price-fixing conspiracy.

Judgments of $7,500 each were paid by American Steel & Wire Co. of New Jersey, Anaconda Wire & Cable Co., Phelps-Dodge Copper Products Corp., General Electric Co., and the Okonite Co., while General Cable Corp. paid a judgment of $500. A complaint against Habirshaw Cable & Wire Corp., a subsidiary of Phelps-Dodge, was dismissed.

The judgments, which were entered in the U. S. District Court for Southern New York, bore notations that they were arrived at "without any admissions of fact by the defendants or any determination of fact by the court."

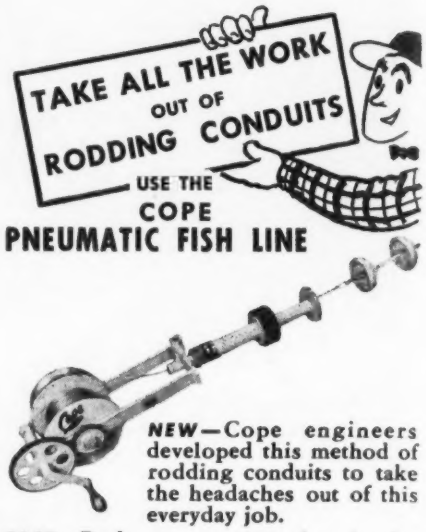
The suit arose out of alleged violations of the Federal Trade Commission's 1936 cease-and-desist order against the National Electrical Manufacturers Association and 16 member companies. The government's complaint charged that the seven defendants had continued a prohibited conspiracy to fix prices of impregnated paper cable, varnished cambric cable, rubber power cable, parkway cable and rubber-covered building wire. Six of the defendants filed answers denying the material allegations of the complaint, while the Habirshaw Corp. made showing that its business had been carried on since 1941 by a division of Phelps-Dodge.

•

Faraday Electric Will Move Boston Plant to Adrian

Faraday Electric Corp. has announced the removal of the Stanley & Patterson Division Boston plant to Adrian, Mich., where the main Faraday plant is located.

In 1945 Faraday acquired the signal systems business of Holtzer-Cabot Corp. and consolidated it with its Stanley & Patterson Division. It was at that time that the Boston plant was established.



NEW—Cope engineers developed this method of rodding conduits to take the headaches out of this everyday job.

FAST—Rods up to 1000 feet in *less* than ten minutes.

PROVED—Enthusiastic users report great savings in time and labor.

Every conceivable precaution has been taken in the design of this tool to assure safe, trouble-free and efficient performance in the rodding of long-run duct lines.

Put the Cope Pneumatic Fish Line to work for you right away!

Write for Complete Information and Prices

T. J. Cope Inc. 6120 Vine Street, Philadelphia 39, Pa.

CABLE INSTALLATION & MAINTENANCE TOOLS & EQUIPMENT

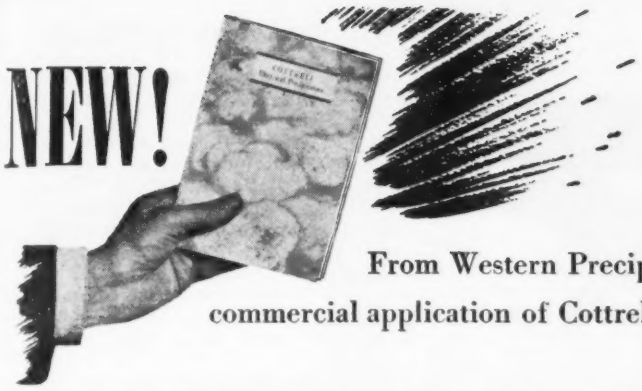
Here's an "extra flexible" type of wire and cable made to give you greater life—better performance. "Controlled Flexibility" of our uninsulated wire and cable opens the way to many new, versatile tasks.

Your exact specifications can be easily met because of our unique production system. For further information write today and ask for catalog #62.

FLEXO WIRE COMPANY

70 WEST FIRST ST. — OSWEGO, NEW YORK

NEW!



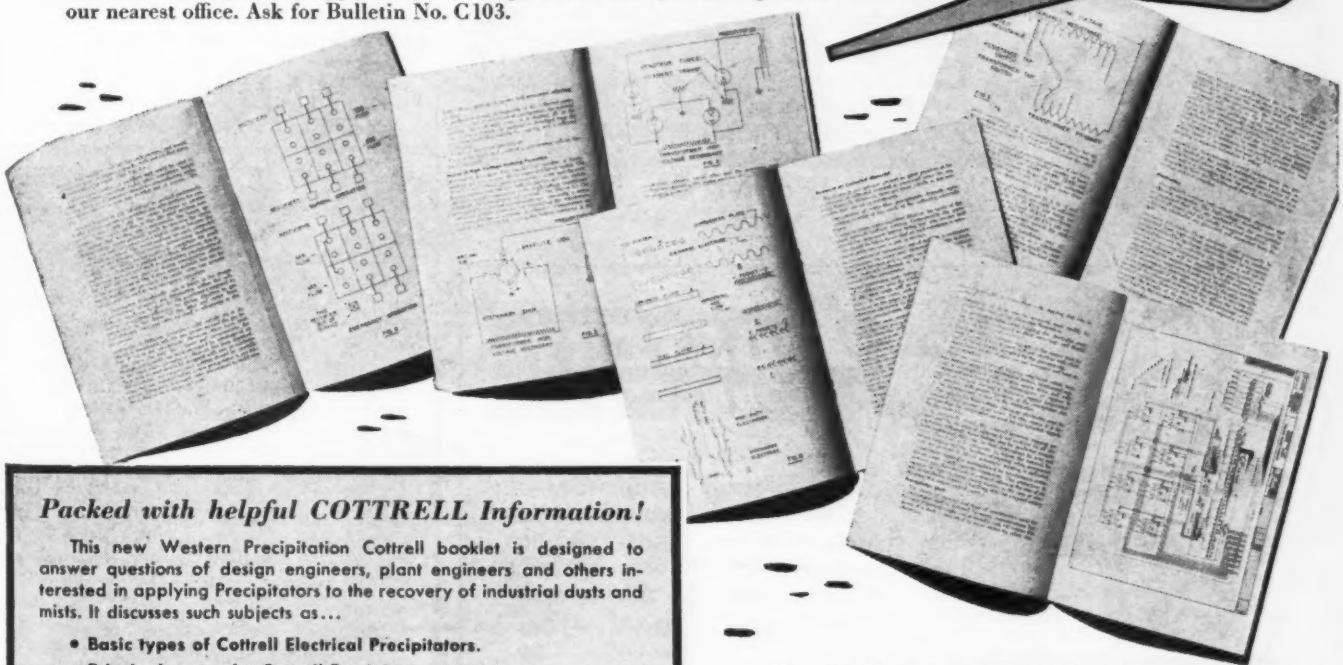
From Western Precipitation—the organization that pioneered the commercial application of Cottrell Precipitation...

28 PAGES of helpful facts to know about COTTRELL ELECTRICAL PRECIPITATORS

IF YOU ARE ENGAGED in any phase of industry where the recovery of dusts, fumes, fly ash, mists, fogs or other suspensions from gases is a problem, you will find this new booklet on the COTTRELL Electrical Precipitator helpful and informative.

Western Precipitation pioneered and installed the first commercial application of the well-known COTTRELL Electric Precipitator—Dr. Cottrell, the inventor, being a member of the company. And for more than 38 years Western Precipitation has consistently led in developing new COTTRELL advancements and techniques for recovering suspensions from gases, both wet and dry.

This new 28 page booklet summarizes many of the basic facts you should know about modern COTTRELL Precipitators—the various types available, how they operate, principal types of electrode systems and rectifiers, shell constructions, etc. As long as the supply lasts, a free copy will be sent you on request to our nearest office. Ask for Bulletin No. C103.



Packed with helpful COTTRELL Information!

This new Western Precipitation Cottrell booklet is designed to answer questions of design engineers, plant engineers and others interested in applying Precipitators to the recovery of industrial dusts and mists. It discusses such subjects as...

- **Basic types of Cottrell Electrical Precipitators.**
- **Principal parts of a Cottrell Precipitator.**
- **Mechanical and Electronic Rectifiers.**
- **Various types of Collecting Electrodes (rod curtains, corrugated plates, dual plates, pocket electrodes, etc.).**
- **Removal of Collected Material.**
- **Factors in Shell Construction (steel, concrete, brick, etc.).**
- **Operating Efficiencies and the Effect of Various Factors on Performance.**

...and many other basic Cottrell facts. Write for your free copy of Bulletin C103 today while supplies are adequate!

Western Precipitation is not affiliated with any other company in the field of electrical precipitation except its wholly owned subsidiaries, International Precipitation Corporation and the Precipitation Company of Canada, Ltd. Whether you are now contemplating the installation of a Cottrell Electrical Precipitator, or may be interested in such an installation at a future date, we can and will serve you in any *part* of the United States or other countries.

NOW SELLING...

COTTRELL Precipitators
MULTICLONE Collectors
TURBULAIRE Spray Dryers

...in all parts of the U.S.A. and foreign countries.

WESTERN Precipitation CORPORATION

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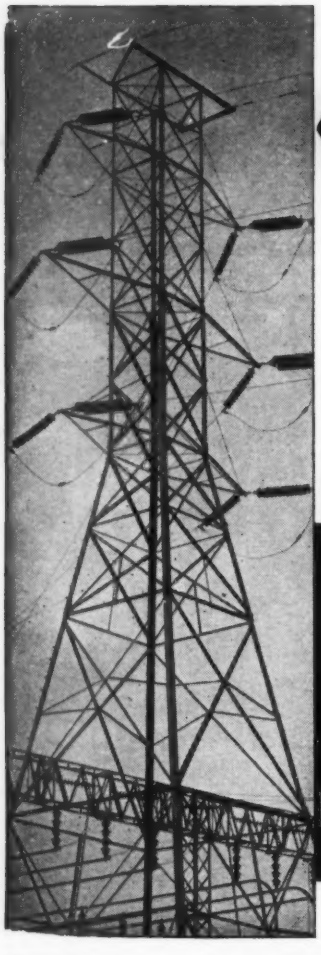

DILLON DYNAMOMETER

A multitude of Dillon Dynamometers are protecting communities and companies alike from failures caused by wires going down in severe storms. Standard for dependable accuracy, simplicity and convenience. Actual size 8¼" x 6¼" x 3". In wide use also in telephone and telegraph work for indication of tension in guy strands, messenger and wire. Many other uses where torque, weight, and overload are vital factors. Take out guesswork of "sight and sag". Hooked on in a jiffy, indicates tensions in seconds. Direct reading. Nine capacities, 500 to 20,000 lbs. There's a place for the Dillon in every Electrical Plant.

Send for illustrated Dynamometer Manual

W. C. Dillon & Co., Inc.
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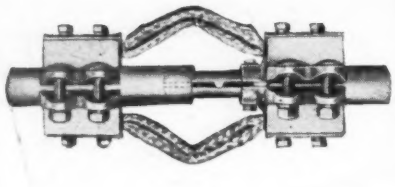
DOSSERT CONNECTORS



TYPE XC

AN EXPANSION CONNECTOR FOR COUPLING TWO STANDARD PIPE SIZE TUBULAR BUSES. FLEXIBLE BRAIDED LINKAGES PROVIDE WIDE LATITUDE OF MOVEMENT AND INSURE COOL OPERATION UNDER MAXIMUM LOAD.

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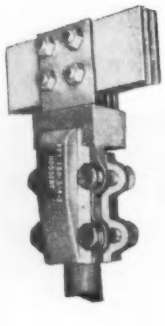

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Recent Rate Changes

QUEBEC HYDRO-ELECTRIC COMMISSION has announced a reduction in electric rates which, estimated on the basis of 1946 electricity sales, will mean a further saving of $1,400,000 to industrial and commercial users, including institutions, churches, schools and hospitals. For customers in the bi-monthly billing group, bills will be issued at the new rates, to cover service used after the regular April-May meter readings; for customers in the monthly billing group, to cover service used after the regular April meter readings.

NEW JERSEY POWER & LIGHT CO.'s report covering the results of the company's operations during the year 1946 has been accepted by the New Jersey Board of Public Utility Commissioners. Under the order accepting the report, charges to electric customers will be reduced $175,000. The reductions are the result of operations in 1946 under the "Rate Adjustment Plan" which was adopted by the Public Utility Board in 1944. The "Rate Adjustment Plan" is designed to establish and maintain just and reasonable rates for electric service by providing definite rules, standards and procedures by which rate revisions are effected in any one year based upon earnings of the previous years. The reduction of $175,000 in electric revenue will be accomplished by minor adjustments in rate schedules which became effective June 1, amounting to $10,600, and by a billing credit to be extended later in the year, amounting to $164,400. This billing credit will apply to residential, commercial, industrial, and street lighting customers billed under service classifications "A", "B", "C", "F", "G", and "H".

SASKATCHEWAN (CANADA) POWER COMMISSION has made a general reduction in light and power rates, which will cost it a drop in revenue of $150,000 annually, according to an announcement by Natural Resources Minister J. L. Phelps. Effective July 1, on the commission's entire system, the new rate will reduce the cost of light and power to a maximum rate of 9 cents per kilowatt-hour. The maximum rate now in effect is 10 cents per kilowatt-hour. A total of 237 towns will be affected by the reduced rate of 9 cents per kilowatt-hour. Rates for 14 of the larger towns which are already on a standard lower maximum rate will be reduced to 8 cents per kilowatt-hour.

NEW YORK PUBLIC SERVICE COMMISSION has instituted a proceeding as to the rates, service, accounts and capital structure of the Deer River Power Co., which supplies electric service in a number of communities in Lewis County.

CORRECTION

The article announcing a $635,000 a year rate reduction by the Tampa Electric Co. (ELECTRICAL WORLD, May 10, Page 152) was in error. There has been no change in the rates of the company since those adopted by the Tampa Utility Board in 1940.

•

Co-op Buys Utility Plant

The La Plata (Colo.) Electric Association has purchased the New Light & Power Co. plant at Pagosa Springs, Colo., for $60,000. REA states some 200 rural homes will be serviced.

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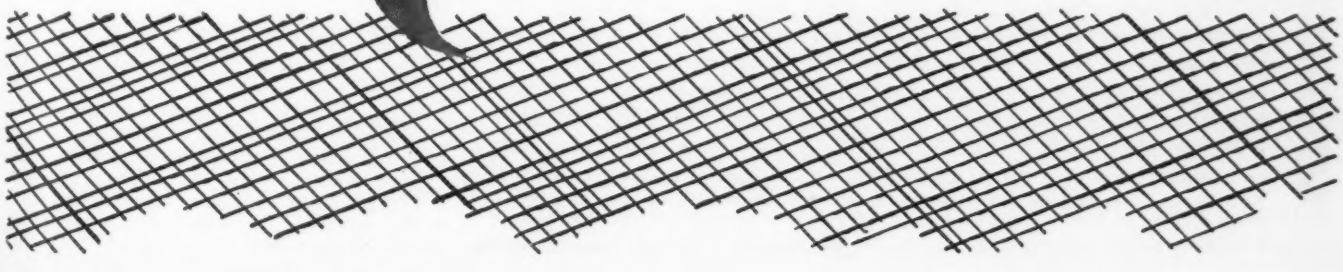

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BOOK REVIEWS

Panel Heating and Cooling Analysis. By B. F. Raber and F. W. Hutchinson. Published by John Wiley & Sons, New York, N. Y. 208 pages, illustrated. Price $3.50.

Serious textbooks are seldom intriguing but this one is because it devastates in convincing logic so many traditional notions about heating systems intended to satisfy human comfort. In demonstrating that, to conserve body heat, it is *not* necessary to heat the whole shelter, it lays the basis for panel heating, whether by air, steam, water, or electricity. The concern of the authors is not to draw invidious comparisons of these competitive methods, but to analyze the panel as a radiant compensator for body heat loss. The mathematical chapters which follow the qualitative evolution afford working data from which electrical engineers can design the pattern most effectively to dispose the kilowatts. Panel heating avoids so much of the waste of traditional systems that the electrical method is afforded a dollar-chance otherwise offered only by the heat pump approach.

Fundamentals of Industrial Electronic Circuits. By Walther Richter. Published by McGraw-Hill Book Co., Inc., New York 18, N. Y. 569 pages, illustrated. Price $4.50.

With the conventional 60-cycle mind in view this Allis-Chalmers engineer purposefully set out to explain away the "strangeness of electronic circuits by the simple approach through familiar R, L and C circuits and familiar forms of non-linear conductors. This paves the way for understanding of the basic phenomena of emission in tubes, in rectifier and triode circuits, amplifiers, bucking circuits, coupling, bias, cathode followers, etc. Other basic arrangements underlying industrial electronics include tuned circuits, oscillators, multivibrators, control circuits, photo tubes and cathode ray tubes. Chaptered to meet the needs of evening students in the University of Wisconsin extension courses, the book has the format of the typical text book but is none the less helpful for the electrical engineer who has at last decided to "get on the electronics' band-wagon."

Alternating Currents. By C. L. Dawes. Published by McGraw-Hill Book Co., New York 18. 708 pages, illustrated. Price $5.

This is the fourth edition of Volume II of Dawes' "A Course in Electrical Engineering" and in it he has entered some of the most significant innovations of the elapsed 12 years. Thus circuit properties are now treated more extensively by conjugates and complex operators, newer instruments are discussed and considerable attention is given to application of magnetically-oriented steel in wound-core transformers. More is presented on synchronous motors, selsyns, low-voltage networks, and on electron tubes including the technique of frequency modulation. For teacher and student it is of note that all the numerous problems are entirely new.

Elements of Mechanism. By Schwamb-Merrill-James. Published by John Wiley & Sons, New York. 428 pages, illustrated. Price $4.

This sixth edition, revised, rewritten and rearranged by Professor Doughtie, continues the original M.I.T. approach to motion analysis, linkages, cams, rolling contacts, gears, worms, trains, belts, ropes, chains, tackle, threads, escapements, etc. Treatment is mathematical, quantitative and extensive in each category.

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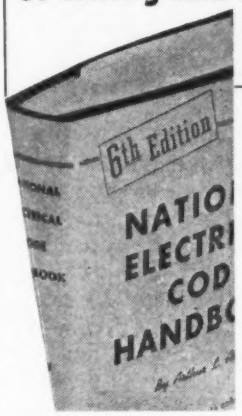

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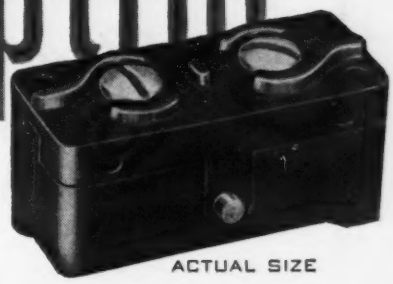

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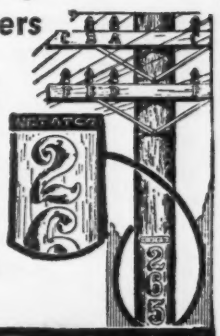

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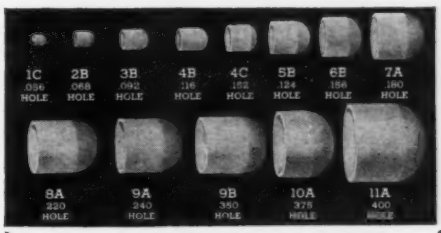

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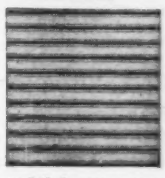

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LETTERS TO THE EDITOR

High-Voltage Air Blast Circuit Breakers

To the Editor of ELECTRICAL WORLD:

I was rather interested to note in the March 1, 1947, issue of ELECTRICAL WORLD a photograph and write-up of some tests made recently at the J. D. Ross Substation of Bonneville Power Administration in the State of Washington. Your article gave the feeling that there was something new and radical in the application of air blast circuit breakers on high-voltage circuits. Our company has been manufacturing this type of circuit breaker in Canada for somewhat over ten years and is offering a complete range of air blast units from the standard low-voltage indoor types up to and including the high-voltage heavy interrupting capacity outdoor units.

Two Type OOAB, 230-kv., 600-amp. 2,500,000-kva. interrupting capacity, air blast circuit breaker and current transformers were installed in the Three Rivers Terminal Station of Shawinigan Water and Power Co. and two duplicate units in the Quebec Terminal Station of the same company in 1941. The Three Rivers circuit breakers went into service late in 1941 and the Quebec breakers in 1942. All four of these units have been in continuous service ever since. These circuit breakers, incidentally, have a total interrupting time of four cycles (60-cycle timing wave) from energizing of trip circuit to interruption of the fault as demonstrated by short circuit tests made at Three Rivers. Tests were also made at Quebec to demonstrate the ability of these units to interrupt the charging current of 181 miles of 200-kv. transmission line. The interruption of charging current incidentally took place in three cycles from energizing of trip circuit.

Your article left the impression that air blast circuit breakers were a class of equipment which was not available on this continent. We felt that perhaps you did not know of our organization and its activities in this field.

G. E. Dunfield
Sales Manager
English Electric Co.
of Canada Limited

Power Factor Explained

To The Editor of ELECTRICAL WORLD:

Your item on page 82 of April 26 issue entitled "A New Analogy for Power Factor" called to mind an explanation which I frequently used in

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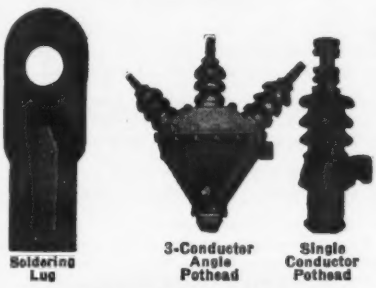

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explaining the effect of lagging loads on a power system.

All the iron in the magnetic circuits of a power system—motors, transformers, lamp ballasts, etc.— functions by virtue of the magnetic flux set up in it. This flux is produced by ampere turns enclosing each magnetic circuit, the amperes lagging the voltage by 90 deg. These magnetizing ampere turns multiplied by the volts applied to each magnetic circuit gives volt-ampere-turns, and the summation of all the volt-ampere-turns in the entire system load must be obtained from some source or sources. Assuming a system without capacitors, these magnetizing volt-ampere-turns flow through the central station generator stator windings where they produce a demagnetizing effect on the generator magnetic circuit. These demagnetizing ampere turns in the stator must be offset by an equal and opposite magnetizing ampere turn in the generator field. Therefore all the iron in the entire system is being magnetized by the d.c. exciter forcing current through the field coils of the a.c. generator. We can't get something for nothing!

The sad part of the story is that all these volt amperes reactive must be carried all the way from the individual loads clear back to the generating stations. They are the worst offenders in producing voltage drops in transformers and lines, since in the voltage vector diagram they subtract almost directly from the source voltage.

This, coupled with the $I^2 R$ losses they produce in the lines and transformers, is the reason for on-the-spot capacitors for power factor correction.

Arnold Benson, Owner
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► As former chairman of the Electrical Engineering Department, University of Denver, Mr. Benson speaks with the voice of authority on the subject power factor—Editor.

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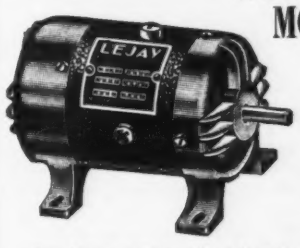

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